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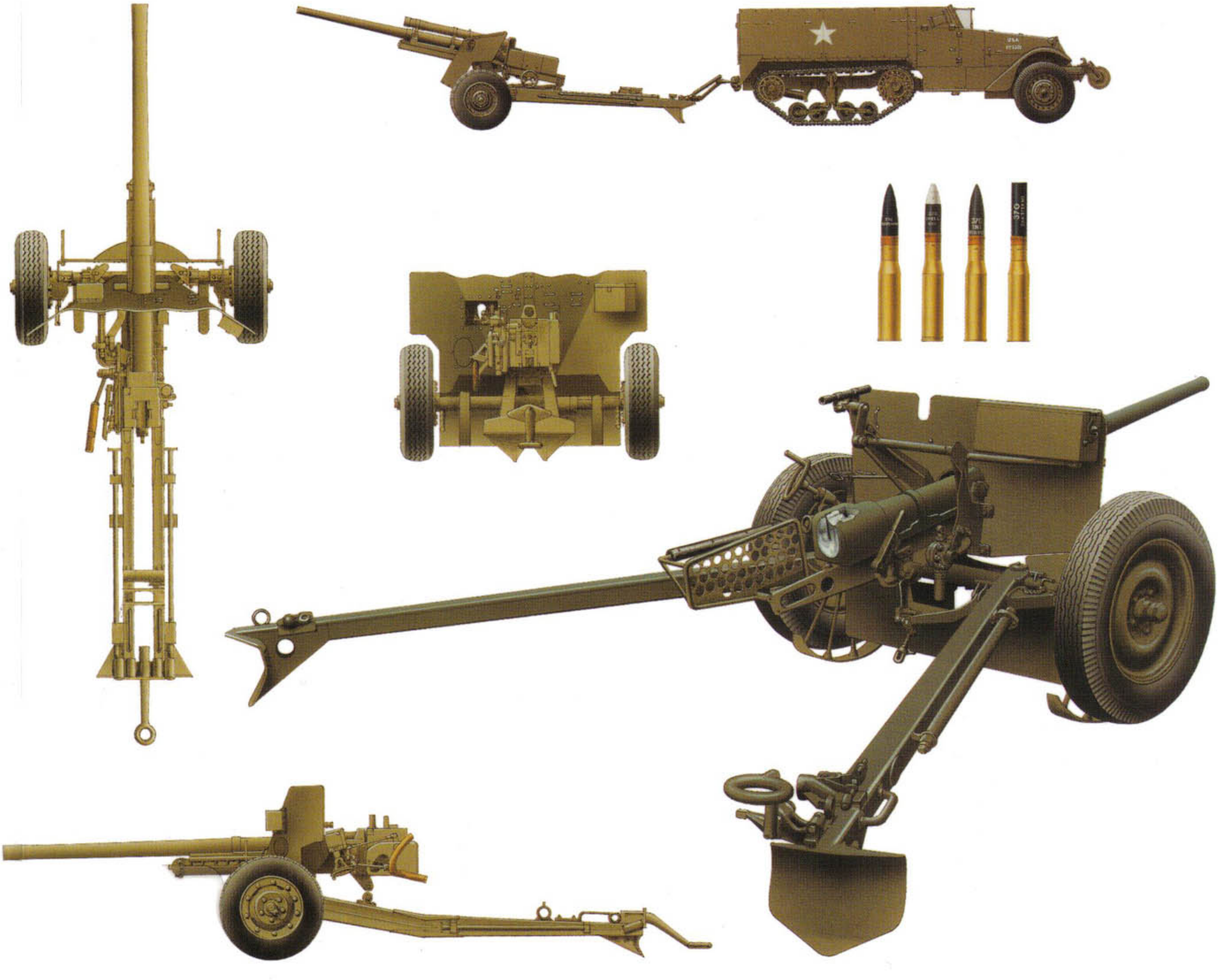
US Anti-tank Artillery 1941–45



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CONTENTS

INTRODUCTION 3

CONFRONTING THE TANK THREAT 3

ALTERNATIVES AND EXPEDIENTS 7

THE 37MM ANTI-TANK GUN IN COMBAT 9

THE 57MM ANTI-TANK GUN 12

MCNAIR'S FOLLY: THE 3IN GUN 17

THE 76MM ANTI-TANK GUN 20

ANTI-TANK COMBAT IN ITALY 21

ANTI-TANK COMBAT IN FRANCE 23

THE TEST: ANTI-TANK GUNS IN THE BATTLE OF THE BULGE 36

THE T8 90MM ANTI-TANK GUN 40

US ANTI-TANK GUNS IN FOREIGN SERVICE 43

US ANTI-TANK GUNS AFTER THE WAR 44

BIBLIOGRAPHY 45

COLOR PLATE COMMENTARY 46

INDEX 48

New Vanguard • 107

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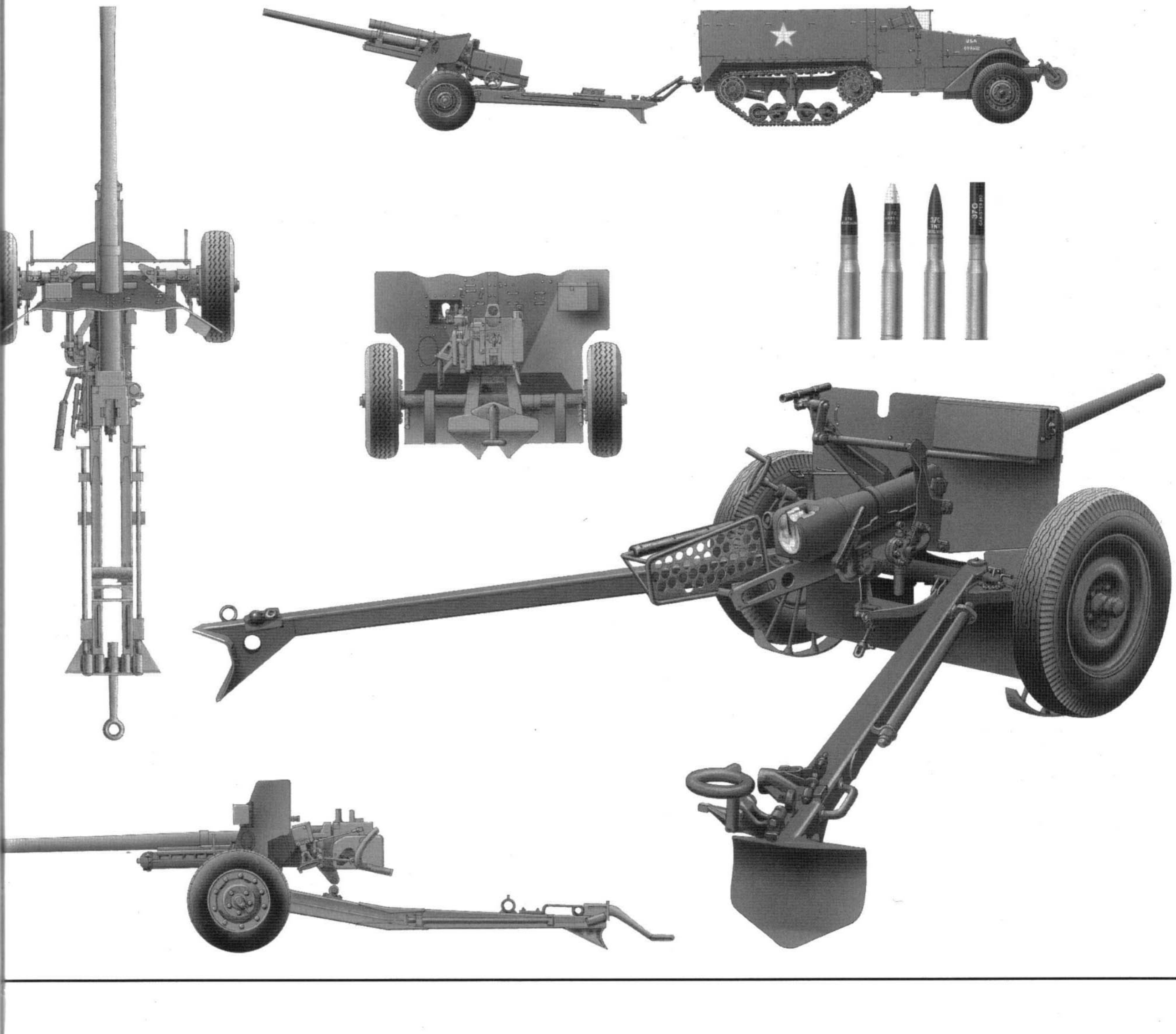

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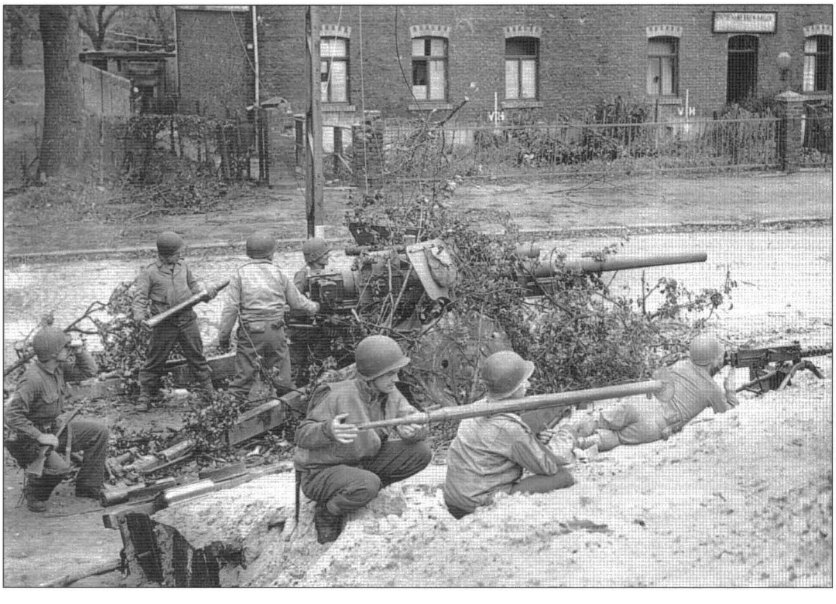
US ANTI-TANK ARTILLERY 1941–45

INTRODUCTION

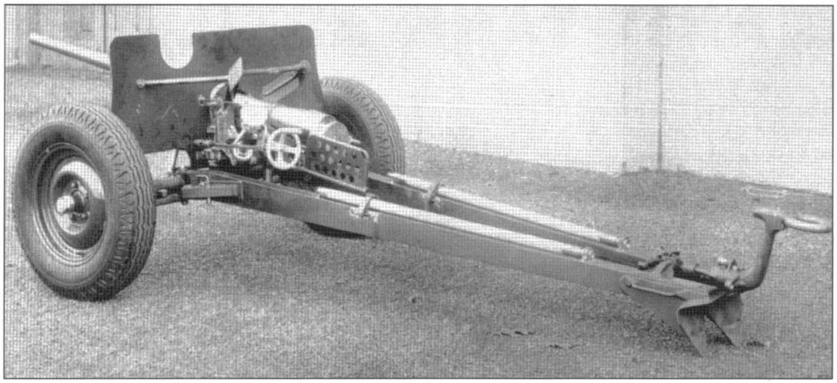
The crucial role played by the tank in the combat zones of World War II prompted the development of effective anti-tank guns. The US Army was relatively slow to field dedicated anti-tank guns, and through most of the war lagged behind the armies of Britain, Germany, and the Soviet Union. As a result, the performance of American anti-tank guns in combat was quite mixed: there were several exemplary defensive actions in the 1944–45 campaign with the 57mm anti-tank gun, but disappointing performance by the larger 3in anti-tank gun. Towed anti-tank guns largely disappeared from the US Army after the war, to be replaced by rocket launchers, recoilless rifles and, eventually, guided anti-tank missiles.

CONFRONTING THE TANK THREAT

The US Army did not field a dedicated anti-tank gun until 1940. After World War I there was some consideration of such a weapon, and in 1935 a French Hotchkiss 25mm anti-tank gun was purchased for evaluation purposes. However, most tanks of the 1920s and 1930s were protected by only 10–15mm of armor, which could be defeated by existing weapons such as the .50 caliber heavy machine gun, or the 75mm field gun. The



A 3in anti-tank gun of the 823d Tank Destroyer Battalion provides support to the 117th Infantry, 30th Division during the fighting in Schauffenburg, Germany, on October 9, 1944, along with a bazooka team and a .50-cal. heavy machine gun. The day before, Kampfgruppe von Fritzchen from Panzer Brigade 108 had attacked the regiment with 11 tanks and 23 StuG-III assault guns, and was finally beaten off with tank support. (NARA)



A pilot of the 37mm gun T3 on T1 carriage is seen here shortly after completion at Rock Island Arsenal in February 1938. Numerous technical changes were made to the design as a result of trials in 1938. (USAOM)

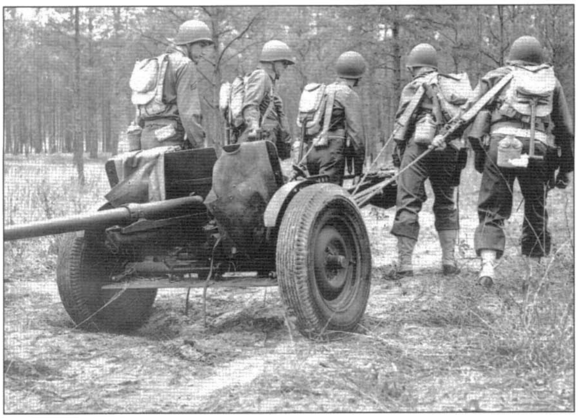
anti-tank companies in infantry regiments were equipped with the .50-cal. heavy machine gun until 1940.

The Spanish Civil War defined the growing role of tanks in modern land warfare. In 1937 US liaison officers in Spain reported that anti-tank guns such as the German Rheinmetall 37mm PaK 36 had proved very effective in countering the tank threat. The US Army had been considering a new 37mm accompanying gun to replace obsolete weapons that had been in service since World War I, and the Spanish Civil War convinced senior officers that the emphasis of these infantry weapons should shift from a low-velocity gun firing high explosive, to a high-velocity gun firing an anti-tank projectile. In January 1937 the Ordnance Committee recommended that work begin on a 37mm anti-tank gun, and a German 37mm gun was purchased for evaluation.

There was no immediate consensus among the combat arms regarding the desired characteristics of a new anti-tank weapon. A conference was held at Aberdeen Proving Ground (APG) in May 1937 to iron out the differences between the Infantry, Cavalry, and Artillery branches over the desired features. The German 37mm gun was displayed at the conference; the general consensus was that the new US gun would be patterned on the German type, particularly its telescopic sight. The conference accepted that the Infantry would direct the program, since it would be the primary user of the gun.

Authorization to build pilot models of the new 37mm Gun T3 and Gun Carriage T1 was granted on September 9, 1937. There was still some controversy over the carriage design: the Infantry wanted the weapon to be operable by a single gunner, while the Artillery favored a two-man crew like a field gun. As a result, a second carriage variation was developed, the T1E1, which had the elevating hand-wheel on the right side to allow the gun to be trained more rapidly against a fast-moving target.

Trials of the T3 gun and T1 carriage at APG in February and March 1938 revealed many faults, including an unstable carriage, poor ammunition, and poor breech design. Four alternative gun designs were prepared to rectify the faults and the new T5 carriage was also developed to cure the problems with the T1. A series of trials was conducted in the summer of 1938 on the various options, and the consensus was that the T10 gun and T5 carriage were the best combination. This was approved on December 15, 1938, the resulting weapon being designated as the 37mm M3 gun and M4 carriage.



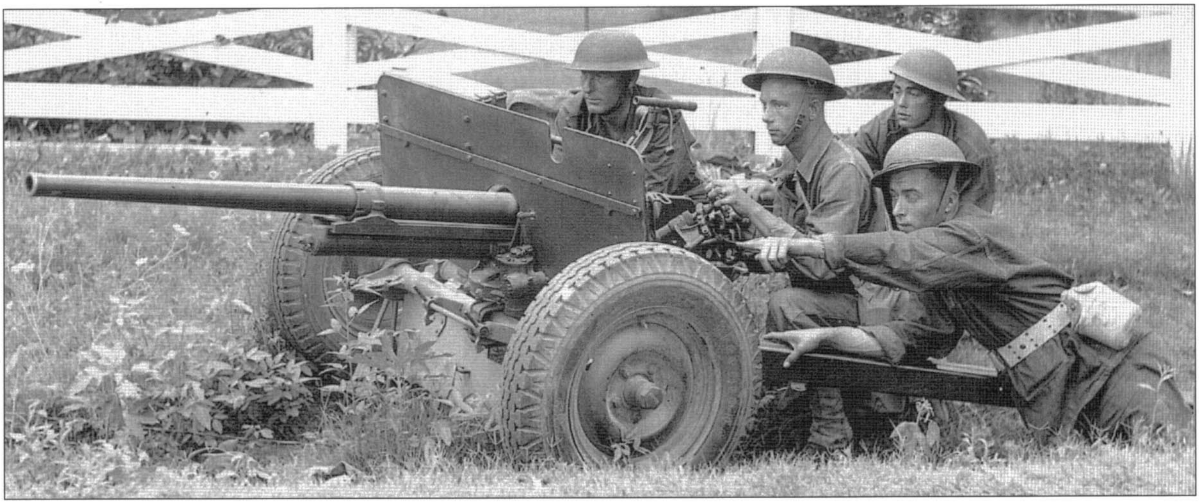
Some Ordnance officers felt that the choice of the 37mm gun was ill-advised in light of the use of the 45mm Soviet anti-tank gun in Spain, and reports of German tanks with improved armor. However, in August 1938 the War Department explicitly instructed Ordnance that the Infantry branch would direct the development of the new anti-tank gun, and that no development funds would be expended in 1939 or 1940 for anti-tank guns with a caliber greater than 37mm. The Infantry continued to favor the 37mm gun over possible alternatives because they insisted on a weapon light enough to be moved easily by a four-man crew.

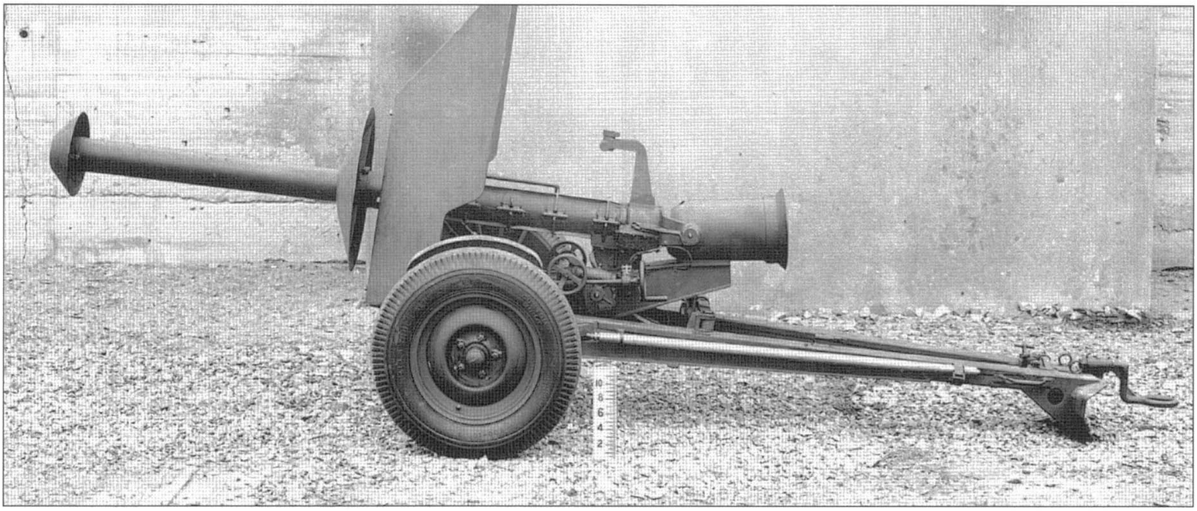
The Infantry Board was not interested in larger anti-tank guns, due to concerns that they could not be handled easily by a four-man crew in combat. This training exercise at the infantry school at Ft Benning in April 1942 shows the prescribed method for towing the 37mm gun by hand. (NARA)

Production of the 37mm anti-tank gun began slowly in the winter of 1940, with the gun manufactured at the Watervliet arsenal and the carriages at Rock Island arsenal. Following Pearl Harbor, President Roosevelt set new goals for artillery production in January 1942, including the manufacture of 18,900 anti-tank guns within two years – even though production in 1941 reached only 2,000 units.

Improvement of the M3 37mm gun and its associated equipment and ammunition continued in 1941. It was found that the artillery-style traversing hand-wheel was difficult to use when tracking a fast-moving tank, even though a traverse-release handle permitted free movement of the gun. A new shoulder guard was developed, along with a modified free-traversing clutch, so that the gunner could engage the new lever with his right hand and push or pull the gun in the proper direction with his arm or shoulder. This modification was standardized on January 29, 1942 as the Carriage M4A1 and became the most common version. Tests showed that under dry ground conditions, the gun tended to kick up dust in front of it, making subsequent aiming difficult. As a result, a gas deflector was developed in 1941, based on the Solothurn design. A modified gun with threading to accept the deflector was approved on March 5, 1942 as the 37mm M3A1 gun. In reality, the deflector was not deployed in combat as it quickly became clear that it could not be used

The 37mm gun began to be widely distributed in 1941, and this new 37mm Gun M3 on Carriage M4 is in use by the Second Army during the Tennessee war games in June 1941. (NARA)



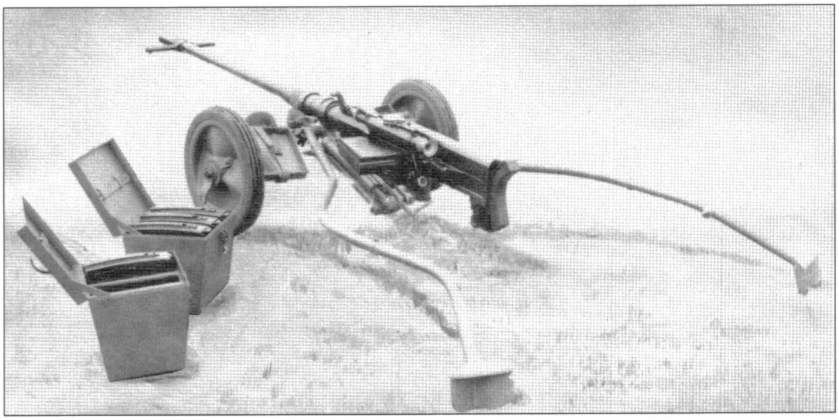


Experimental work to enlarge the bazooka anti-tank rocket launcher was done with the aim of replacing conventional artillery, but did not prove successful. This is the 4.5in rocket projector T3 during trials in September 1942, based on the M4 carriage of the 37mm gun. (NARA)

safely with canister ammunition; its use was canceled on January 28, 1943. A Hughes Recoil Control design was tested later in 1942, but was rejected in November 1942. On March 12, 1942 the use of combat tires on the M4 and M4A1 carriages was approved, though low-cost commercial tires were used on guns in training units. A scheme to fit the carriages with low-cost steel wheels was rejected in the summer of 1942 after their unsatisfactory performance. On May 20, 1943, Ordnance directed that all M4 carriages be upgraded to M4A1 configuration, though in practice this was not completed.

A number of experimental versions of the 37mm anti-tank gun were developed. In October 1942 Airborne Command requested the development of a version with removable trails to make it easier to air-drop. Although developed and tested, the project was canceled in June 1943 as unnecessary. Marine Corps units in the Pacific theater were unhappy with the very small shield of the 37mm gun, and developed their own enlarged design at Pacific workshops. This shield had irregular edges based on engineer camouflage suggestions, aimed at breaking up the predictable geometric shape of the shield. Plans were sent to the United States and a project was started in May 1944. One pilot version was sent to the Marine Corps and another to APG in December 1944, but the effort was canceled in April 1945 with the diminishing importance of the 37mm gun, even in the Pacific theater.

With the insistence of the Airborne and Cavalry on a very light gun instead of the later 57mm gun, Ordnance examined the possibility of extending the life of the 37mm gun by converting it to a tapered-bore gun. In such a weapon, the projectile starts at one diameter and is gradually squeezed to a smaller diameter, increasing the projectile velocity and therefore its penetrative power. The US Army had examined various types of tapered-bore anti-tank rifles and guns before the war, and interest in the concept was revived in September 1941 after reports of the German use of the Gerlach 28/20mm anti-tank gun in North Africa. Several different 28/20mm guns were built and mounted on 37mm gun carriages, but manufacturing difficulties prevented any serious testing. In parallel, Ordnance began to examine the use of tapered adapters on the normal 37mm gun that could be attached using threading and a collar at



The Cavalry and Marine Corps wanted a light anti-tank weapon to supplement the 37mm gun, and the Army selected the 20mm automatic gun T3, based on the Solothurn S.18/1000. Procurement of a small batch from Switzerland was planned in 1941 followed by licensed manufacture, but delays in the contract negotiations led to the cancellation of the program. (NARA)

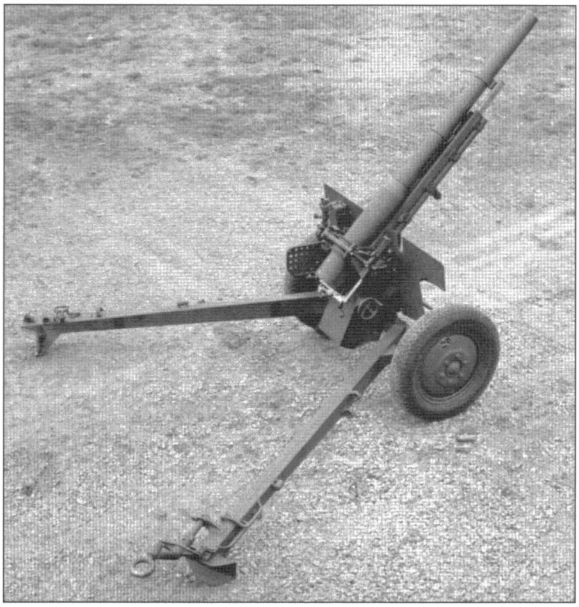
the bore. A British version, the Littlejohn adapter, was tested in 1942 but abandoned because the adapter distorted after firing a few rounds.

Two different adapters that squeezed the projectiles to 28mm were developed. The first, the High Velocity T22, was a projectile with a deformable aluminum jacket. Tests were unsuccessful and it was followed by the T23, a tungsten carbide projectile, also with a deformable duraluminum jacket. This round had an initial muzzle velocity of 4,400 feet per second compared to 2,886 for the normal 37mm M51 APC shot, and could penetrate 4in armor plate at 20 degrees at 100 yards; the normal 37mm round could not penetrate even 3in plate. However, the use of the adapters placed considerable strain on the gun, often knocking it out of alignment. Work on tapered-bore guns continued throughout the war, but the problems with the concept were never completely ironed out, and none were adopted for service. Experimental work was also done on rocket launchers as an alternative to conventional tube artillery, but none of the towed types proved practical.

ALTERNATIVES AND EXPEDIENTS

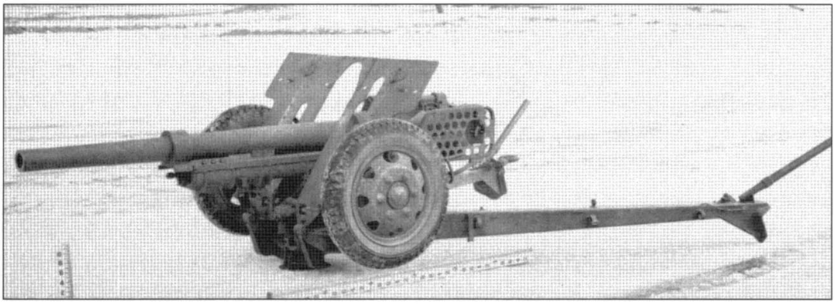
In 1938 the Marine Corps and the Cavalry decided that they needed a lighter, more portable anti-tank weapon than the 37mm gun for some roles, but with better anti-armor performance than the .50-cal. heavy machine gun. Ideally, the weapon would be portable by two soldiers or carried by a horse as a single pack-load. Ordnance had been developing the T4 .90-cal. (23mm) automatic gun for aircraft use since 1937; however, it was not configured for ground use, so the Army examined foreign designs and selected the Swiss 20mm Solothurn S.18/100 gun. The initial tests were disappointing as its performance was not significantly better than the .50-cal. heavy machine gun. Solothurn provided a substantially improved version, the S.18/1000, in April 1940, and the new weapon demonstrated much better anti-armor performance and improved design features. Both the Cavalry and Infantry Boards recommended adoption of the weapon and it was standardized for limited procurement under the designation of 20mm automatic gun T3. Comparative trials between the 20mm T3 and .90-cal. T4 were conducted at APG in the spring of 1941, and while the .90-cal. gun had better anti-armor performance, it was too complicated and cumbersome for Army use. Initial authorization was granted for the purchase of 50 Solothurn guns with an aim to eventually license-manufacture in the United States. The plans floundered following protracted contract negotiations, delays in providing the first weapons for at least six months, and the Army's belief that it would take a year or two before series production could begin even after the contract was signed.

The issue became further complicated by the arrival of less conventional alternatives. Ordnance had been working on rocket-propelled anti-tank grenades that could be fired from rifles or machine guns. Although on the verge of series production, the launch method affected the grenades' accuracy. In May 1942 the Special Projects Unit proposed launching the grenade from a tube. A pilot was hastily constructed and demonstrated with considerable success, eventually becoming the M1 2.75in Anti-tank rocket launcher, better known as the bazooka. The history of the bazooka is outside the scope of this short book, but it is worth noting that the advent of this weapon put an end to any significant work on light anti-tank guns beyond the abandoned Solothurn project.

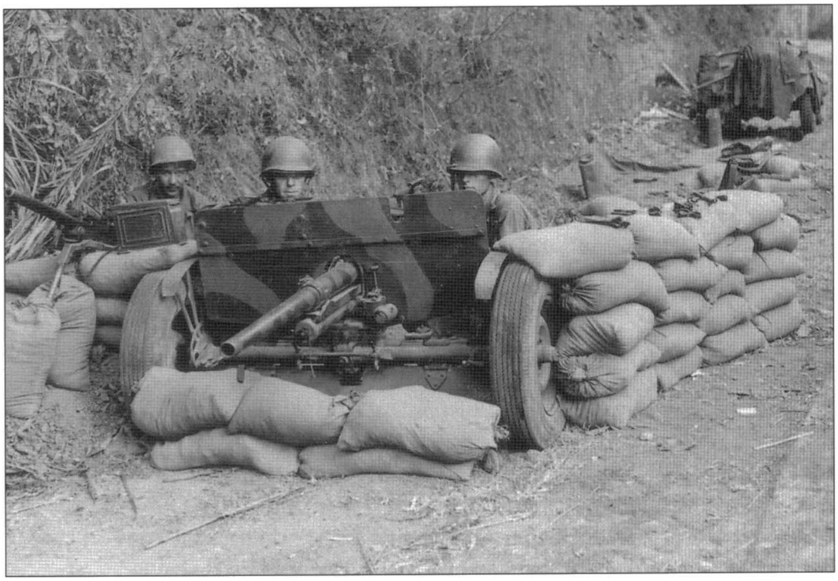


In 1940 the Artillery wanted an expedient anti-tank gun to make up for the lack of suitable modern weapons in the US arsenal. The World War I French M1897 75mm gun was mounted on the M2A3 carriage with direct sights in order to fulfill this role, and over 900 were converted. (USAOM)

While the Cavalry and Marine Corps were pressing for lighter anti-tank weapons, Ordnance and the Artillery were requesting heavier weapons with better anti-armor penetration. Ordnance officers were still concerned that the 37mm gun did not have sufficient armor penetration to deal with future threats. The defeat of the French army in June 1940 created a crisis in the US Army, which was worried about the lack of modern anti-tank weapons of any sort. The Artillery wanted a short-term solution to the problem, and as an expedient Ordnance recommended using surplus 75mm M1897 guns on the new split trail M2A3 carriage and fitting them with direct-fire anti-tank sights. The basic conversion work had already been approved as a method to modernize this venerable World War I French gun, and the adaptation of a direct-fire sight was simple. Manufacture of the appropriate carriages began in July 1940 and a total of 918 were completed through November 1941 when the program ended. The resulting weapon was designated as the 75mm Anti-tank gun on Carriage M2A3. There was only a limited number of old 75mm guns available, so studies were also conducted into mounting the 75mm M3 tank gun on various carriages for use as an expedient anti-



A shortage of French 75mm guns led to a search for other quick solutions, such as mounting a 75mm M3 tank gun on a 75mm M3A1 howitzer carriage, as seen here during trials at APG. By the time this weapon was developed the Tank Destroyer Center had decided to concentrate on self-propelled guns, so no further conversions were made. (USAOM)



A 37mm anti-tank gun of the headquarters company of the 7th Cavalry is used to form a roadblock near Santo Tomas, on Luzon, on March 25, 1945. The Japanese Army deployed the 1st Armored Division in the Philippines along with a number of separate tank units. However, the thin armor of Japanese tanks was vulnerable to the 37mm gun, even in 1944–45. (NARA)

tank gun. Although the trials at APG showed merit, the program ended due to lack of a requirement for further weapons of this type.

Under the October 1940 Table of Organization and Equipment (TO&E), the 155mm howitzer battalion in each infantry division had an anti-tank gun battery with eight 75mm anti-tank guns. The Army wanted to concentrate its anti-tank capabilities, so on July 24, 1941 the War Department ordered the activation of an anti-tank battalion in each division. This battalion would include the eight 75mm guns formerly in the 155mm battalion, and be reinforced by two more companies of the new 37mm guns as they became available. In addition to the divisional battalions, the Army began to form separate anti-tank battalions under GHQ control. Several of these were used in the Louisiana war games in the autumn of 1941.

These war games helped clarify Army planning for the anti-tank force. Instead of deploying the anti-tank battalions in the infantry divisions, the anti-tank mission was transferred to the new Tank Destroyer Center in December 1941. On December 3, all anti-tank battalions were removed from the divisions, renamed as tank destroyer battalions and placed under GHQ control. The new Tank Destroyer force preferred the use of self-propelled guns, so the towed 75mm anti-tank gun went into limbo in 1942 as a self-propelled version of the M3 half-track became available (see New Vanguard 11: *M3 Halftrack* for further details).

THE 37MM ANTI-TANK GUN IN COMBAT

As the 37mm anti-tank gun became available in quantity in 1941 it began to replace the .50-cal. heavy machine gun in US Army infantry divisions. Each infantry battalion deployed an anti-tank platoon with three 37mm anti-tank guns, and each infantry regiment had an additional anti-tank company with nine guns, for a total of 18 per regiment. The TO&E officially authorized the use of ¾-ton trucks as the prime movers for these guns, but many units were issued the lighter ¼-ton truck (jeep) instead. The first combat use of the 37mm gun occurred in December 1941 during the campaign in the Philippines. There is very little record of their effectiveness in the fighting.

The relative absence of Japanese tanks meant that the 37mm gun was more often used for direct fire support. This 37mm gun from the Army 7th Division is seen in action on Kwajelien following the amphibious landing on February 1, 1944. The area behind the gun is littered with the fiberboard packing tubes in which the 37mm ammunition was delivered. (NARA)

The first major anti-tank engagement of the Pacific campaign took place on Guadalcanal in October 1942, when US Marine 37mm anti-tank guns decimated the Japanese 1st Ind. Tank Company during its attempted assault over the Matanikau river, the Japanese losing most of their Type 97 Chi-ha tanks. There were few Japanese tanks present during the fighting on Guadalcanal, so the 37mm anti-tank gun was used most often for general fire support. They proved light enough to be moved by hand through the jungle when a mission required them to destroy bunkers, for example. They were also successfully used in a defensive role, firing high explosive or canister ammunition. In contrast to the European theater where the 37mm gun was obsolete almost from its debut, the 37mm anti-tank gun remained an effective anti-tank weapon in the Pacific until the end of the war, and remained in US Marine service until 1945. Although some Army units began using the 57mm gun in 1944, other divisions retained the 37mm gun until the war's end. Japanese tank armor did not appreciably improve during the war, but more importantly, the 37mm gun was easier to employ in the Pacific jungles than the much heavier 57mm gun.

US infantry divisions taking part in the landings in North Africa in November 1942 were equipped with the 37mm anti-tank gun. At the time that the US Army entered combat in North Africa, the 37mm was already past its prime. While it could still defeat some of the older German and Italian tanks, the PzKpfw III and PzKpfw IV had gradually been up-armored to the point where the 37mm could not penetrate them in a frontal engagement except at close ranges. At the time, the standard German anti-tank gun was the 50mm PaK 38 and the standard British anti-tank gun was the 6-pdr (57mm), both a generation more advanced than the US anti-tank gun in terms of penetrating power. During the debacle at Kasserine Pass, the 3/39th Infantry, 9th Division was overrun in spite of its 37mm guns, and they lost all their guns. Rommel's Afrika Korps claimed to have captured or destroyed 67 anti-tank guns during the battle.

The Army Ground Force (AGF) sent observers to the theater to evaluate tactics, training, and equipment. One of the first teams to report back after Kasserine Pass on March 5, 1943 passed on scathing remarks about the 37mm gun:

> Two general officers condemned this gun as useless as an anti-tank gun and strongly recommended that it be discarded. They stated that it would not penetrate the turret or front of the German medium tank, that the projectiles bounced off like marbles, and the German tanks over-run the gun positions. The G-3 of the Allied Forces informed me that the above recommendation had been approved and they do not want the 37mm gun.

Although the 37mm gun was long since obsolete in Europe, it continued to see extensive use with Army and Marine units in the Pacific until the end of the war. Here, a 37mm gun of the 306th Infantry, 77th Division is seen providing fire support during the fighting on Guam in July 1944. (NARA)

However, the observer believed that the gun was often improperly used and that too much was expected of it. He suggested that the question of discarding the gun be left open until more battlefield experience had been accumulated, and in the event, the gun was still useful against other targets. There was some unanimity about the need for a more powerful gun in the regimental anti-tank company, with most of the senior officers advocating a self-propelled 75mm gun.

When the AGF drafted the new infantry division TO&E in March 1943, these reports were still fresh in their minds. The 37mm gun was left in the division mainly because of lingering uncertainties about its adequacy, and the realization that it would take some time to order 57mm guns for the US Army along with preparing the necessary ammunition and training. Observer missions continued to send back their reports on the gun. An artillery officer, BrigGen Thomas Lewis, was sent to Tunisia in March 1943 to evaluate the problem. A team of officers used a captured PzKpfw III medium tank as a target and subjected it to fire from 37mm and 57mm guns. They found that the 37mm gun would penetrate the turret front at 300yds and the hull sides at 600yds. However, the spaced armor over the driver's plate was impervious to the 37mm M51 APC round. BrigGen Lewis concluded in his June report that:

> The 37mm gun, sited with care, i.e. – for flanking fire – and to prevent premature opening of fire at excessive ranges, is a very effective anti-tank weapon. It has fallen into disrepute only because it has been used incorrectly.

The team found that the 57mm gun "is effective against all types of enemy medium tanks at ranges up to 1000yds." A June 1943 report by the pugnacious MajGen Walton Walker was more critical:

> The troops in this theater have lost confidence in the 37mm anti-tank gun … Many enlisted men complained that they were told that this weapon would stop a tank and found out it would not do so.

An armored infantry officer from the 1st Armored Division was even more blunt:

The first large-scale use of the 37mm anti-tank gun was in Tunisia in 1942–43. By the time it entered combat against the Wehrmacht, German panzers had been improved to the point where their frontal armor was largely impervious to the 37mm gun. (NARA)

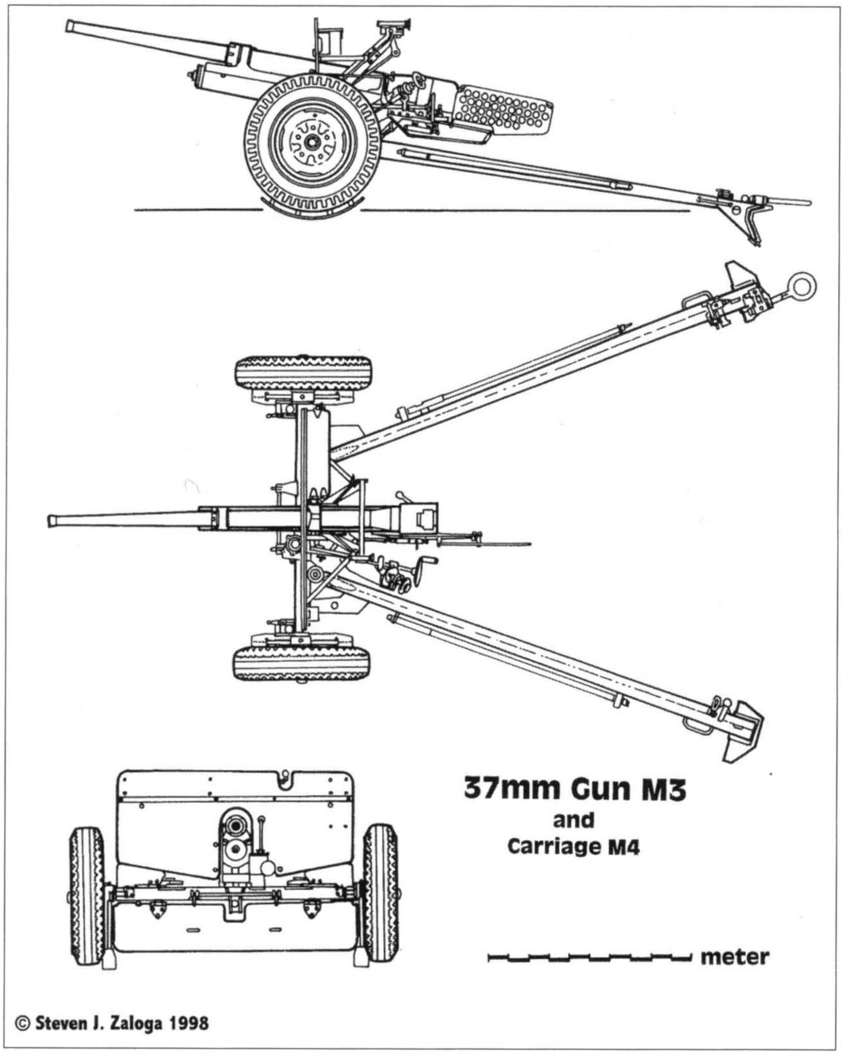
> In my opinion, the 37mm is useless unless you have gun crews with the guts to stand and shoot from 100yds. I think we are placing faith in a false reed there.

By the late spring of 1943 the AGF recognized that the 37mm gun was obsolete and would have to be replaced in the infantry divisions. The May 26, 1943 TO&E for the regimental anti-tank company substituted nine 57mm guns for the 37mm guns, and authorized the use of the new 1½-ton truck as its prime mover. In fact, it would take more than six months for this to be executed, and significant numbers of US 57mm guns did not enter combat until the spring of 1944.

THE 57MM ANTI-TANK GUN

In February 1941 the Chief of Ordnance ordered the start of a program to manufacture the British 6-pdr (57mm) anti-tank gun in the United States. Although there was no US Army requirement for this weapon, it was presumed that it would be manufactured for Lend-Lease transfer. The British liaison officers in the US had made it clear that they felt that

An exposed 37mm anti-tank gun of the 168th Infantry, 34th Division waits for the panzers in the desolate Faid Pass on February 14, 1943. The Afrika Korps struck that day in the opening phase of Operation *Freuhlingswind*, eventually reaching the Kasserine Pass. These battles made it clear that the 37mm gun was obsolete and needed immediate replacement. (NARA)



the 37mm anti-tank gun was ineffective against German tanks by this stage of the war, and that a weapon at least as powerful as the 6-pdr was needed. Two 6-pdr Mk. II guns and 100 rounds of ammunition were sent from Britain for this purpose.

The original British 6-pdr Mk. I gun from 1939 had a longer barrel than the standard Mk. II production model. The shorter barrel was adopted on the Mk. II for production convenience – there was a shortage of longer gun lathes in Britain when series manufacture started in November 1941. When production began in the United States three months later, the US version reverted to the initial, longer barrel length, as there was no restriction on gun lathe capacity. The extra 16in had the effect of increasing the initial muzzle velocity by about 100ft per second, thereby enhancing anti-armor penetration. British 6-pdr production also reverted to the longer barrel once lathe capacity increased. The Army decided to classify the gun as substitute standard later in 1941, even though there were still no US plans to adopt the weapon. The US-manufactured weapons were designated as the 57mm gun M1 on Carriage M1.

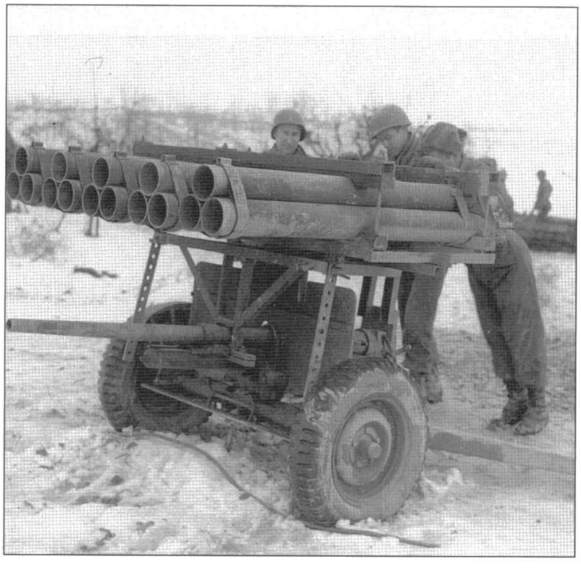
Ordnance began to develop improvements to the 57mm gun, some in conjunction with the British and some independently. The first change to the carriage was the adoption of US combat tires and wheels; these carriages were designated as M1A1 and classified as limited standard. In June 1942 British liaison teams requested that the carriage be modified using a free traverse, instead of relying only on geared traverse, to match the British production improvements. These carriages were designated as M1A2 and all guns manufactured after September 1 1942 had this feature.

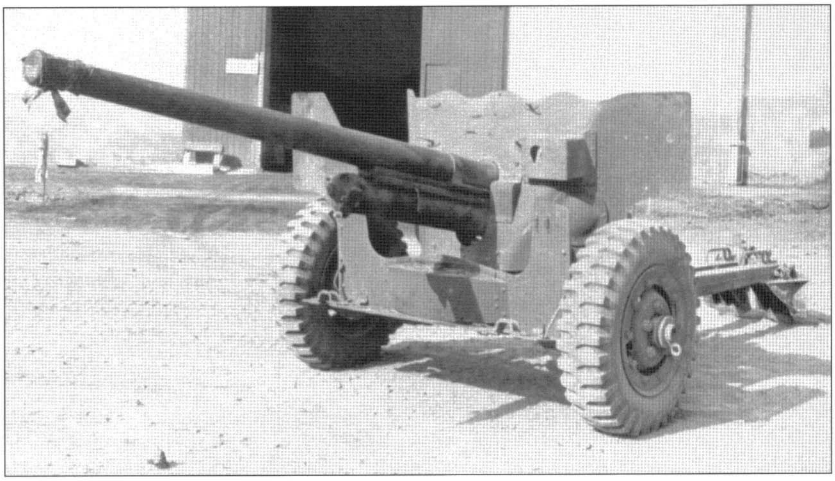
The US Army felt that the 6-pdr carriage wasn't stable enough and recommended that a domestic design be initiated in May 1941. This was eventually approved as the 57mm gun T2 and carriage T1. Four pilots were constructed, two based around the hydropneumatic recoil mechanism of the 75mm pack howitzer, and two with hydrospring recuperators. The T2 gun used the same 57mm ammunition as the British. Testing of the designs began in the spring of 1942, and comparative trials were conducted with the American-manufactured 57mm (6-pdr) in the summer. Although the new American carriage design was generally more stable than the original British design, there was still no US Army requirement for a towed 57mm anti-tank gun; it was therefore difficult to justify production of the weapon, as the gun had the same ballistic performance as its British counterpart. The project was kept open and many improvements incorporated into the design, but it proved to be a waste of effort.

As the US Army entered combat in North Africa in November 1942, complaints about the inadequacy of the 37mm anti-tank gun began to grow in number and intensity. As previously mentioned, infantry officers serving in North Africa were adamant about the need for a more effective anti-tank gun. The Infantry Board back in the US was still not happy with the idea of adopting a heavier anti-tank weapon than the 37mm gun; the 57mm gun was almost three times as heavy – 2,100lb versus 910lb for the 37mm gun. However, in the wake of the poor performance of the 37mm gun in Tunisia, the Infantry Board had no choice and acquiesced to the replacement of the 37mm gun by the 57mm gun in the spring of 1943.

The adoption of the British 57mm gun made the most sense as it was already in production in the United States. Ordnance felt it was the wrong move, since the 57mm gun would be obsolete by the time it reached service. The Ordnance viewpoint was ignored, however, as the Infantry was not prepared to adopt a gun as heavy as the 57mm, and would not seriously consider a larger caliber gun that would be even heavier. The Infantry Board Tests tested the 57mm gun in the spring of 1943; their main observation was that the lunette assembly on the guns was not acceptable for towing using standard US Army trucks. A trailer-type lunette based on the 75mm gun carriage M2A3 was adopted, and the modified carriage was classified as the M1A3. This was the first version of the 57mm family to be classified as standard for the US Army. British liaison officers

Even though it was obsolete, GIs still found tasks for the 37mm gun in Italy. This Fifth Army Ordnance team mounted a cluster of aircraft rockets on a 37mm carriage to provide some improvised firepower in late January 1945. (NARA)





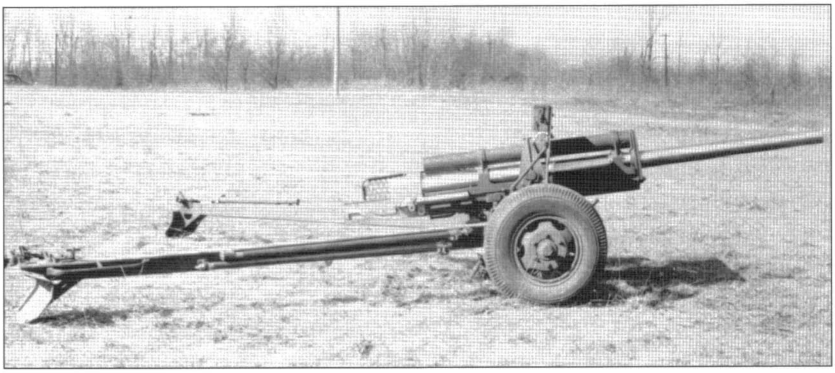
Production of the British 6-pdr anti-tank gun began in the United States in 1942 to satisfy British Lend Lease requirements. The longer gun tube and US-pattern combat wheels distinguish the American-manufactured 57mm M1 gun. This example is seen in Oran in April 1943, one of the first 57mm guns to arrive in the combat theater. (NARA)

indicated that they had no need for this modification, so the M1A2 carriage remained in production for Lend-Lease requirements, along with the M1A3 for the US Army.

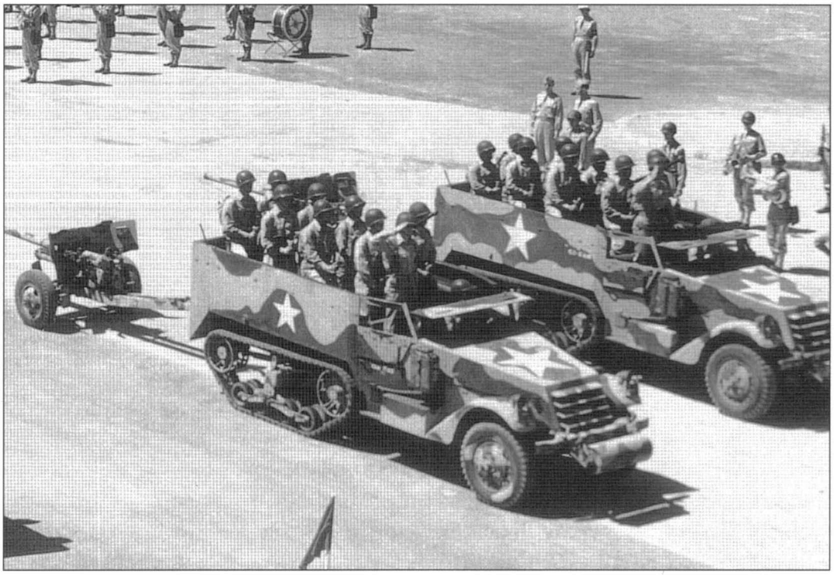
Other branches of the Army remained hostile to the 57mm gun because of its weight. Although the Airborne Command wanted a better anti-tank gun, tests at Camp Mackall in the summer of 1943 found the 57mm gun to be too heavy and too difficult to airlift, so they rejected it. The Cavalry also vetoed it because of its weight.

The 57mm gun was first authorized for use in the regimental anti-tank companies in May 26, 1943 TO&E. In contrast to the 37mm anti-tank gun, which was allotted the ¾-ton truck for towing, the new tables substituted a Dodge WC62/WC-63 1½-ton 6x6 truck as the prime mover. Under the new organization, the anti-tank company in each regiment included three anti-tank platoons, each with three 57mm guns and an anti-tank mine platoon. Each infantry battalion had its own anti-tank platoon with three 57mm guns, so in total the division's three regiments each had 18 57mm guns. There were exceptions to this reorganization, notably in the Pacific, where the 37mm gun remained in some units.

Further improvements to the 57mm gun were developed. The Infantry Board continued trials of the gun through the winter of 1943–44, issuing a report in February 1944 on the desired changes. The side shields were to be retained even though the board noted that, "their value was purely psychological." A caster wheel assembly was added to the carriage to assist



Prior to the decision by the US Army to adopt the British 57mm gun, Ordnance developed its own 57mm anti-tank gun, the 57mm T2 gun on T1 carriage, seen here on trials at APG in February 1942. Although the army preferred its carriage, the new design offered no ballistic advantage over the British gun that was already in series production. (MHI)

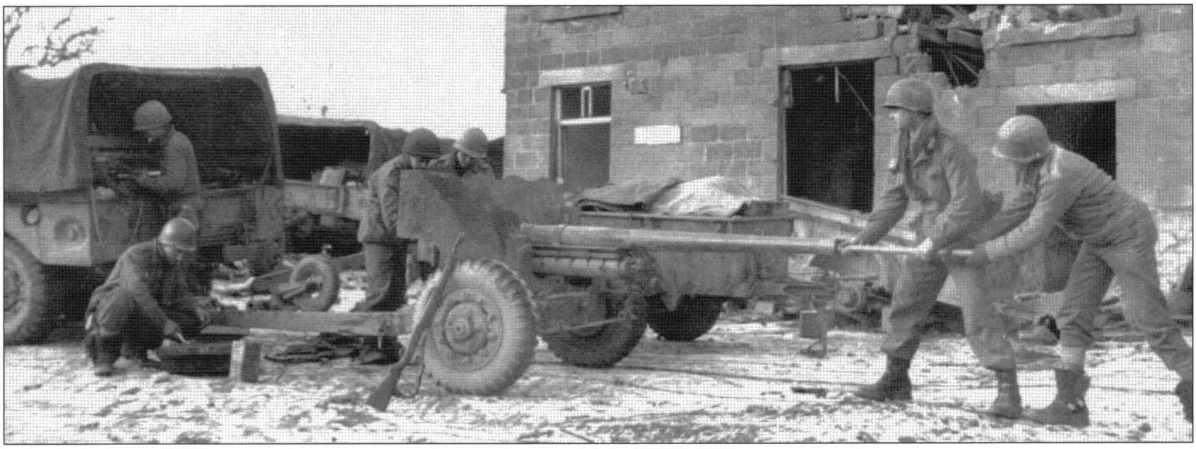


The 57mm gun began arriving in North Africa in the spring of 1943, and was used to re-equip some of the infantry divisions earmarked for the invasion of Sicily. Here, they are seen with a unit from the 34th Division during a Fourth of July parade in Rabat, Morocco, in 1943. M3 half-tracks, instead of the authorized 1½-ton-trucks, which were not yet available, are towing them. (NARA)

in manhandling the gun in field conditions, along with handspike brackets and rammer staff brackets. The trail handles were relocated, and a new utility box was adopted. These changes resulted in the Carriage M2. Two different types of elevation gear improvements were considered, a rack-and-pinion type finally being selected in January 1945 for the new Carriage M2A1.

A number of experimental developments were made on the 57mm gun. The US Army examined a 57mm gun fitted with the British Molins Automatic Loader Mk. I, but never seriously considered its use in an anti-tank role. One 57mm carriage was fitted with skids on either side of the trails to examine whether this feature would ease movement of the gun in muddy or snowy conditions, but this was not adopted for service use. The T10 57/40mm taper bore adapter was tested on the 57mm gun, but the decrease in diameter proved to be too great for the ammunition and the project was eventually abandoned.

One of the most significant problems at the time of the 57mm gun's introduction into US Army service was the lack of ammunition types. Due to the sudden rush to put it into service, there was no production of ammunition types other than the basic armor-piercing round. The US Army in Tunisia had found that the best mix was a ratio of 85 percent armor-piercing, 10 percent high explosive, and 5 percent canister, but the later types were not ready when the gun was accepted for service in May 1943. Patton's Seventh Army on Sicily was critical of the lack of a high explosive round for the 57mm gun, since in many situations the weapon was used against targets such as buildings where an armor-piercing round was less than ideal. The T18 (later M303) high explosive round was authorized in March 1944 but was not available during the Normandy campaign. As a result, US units in France had to scrounge high explosive ammunition from British stocks for the first months of fighting in France. The T17 (later M305) canister round was produced in test batches in April 1944, but production did not begin until January 1945 and so the 57mm canister round did not arrive in combat in any significant numbers.

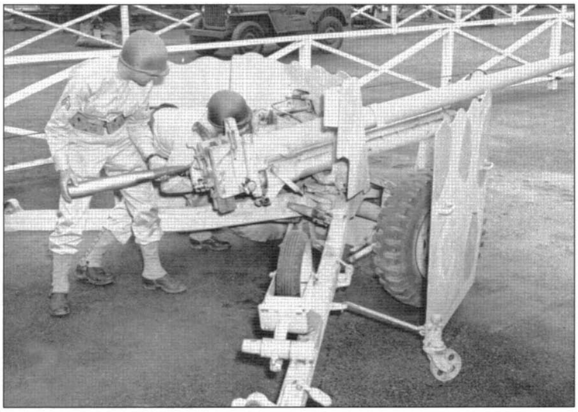


The final version of the 57mm gun to enter service included the M2 carriage, distinguishable by a caster wheel on the right trail to assist in moving the gun. Here it can be seen folded upward in the travel position. This gun crew from the 334th Infantry, 84th Division is servicing their gun in Marche, Belgium on January 2, 1945 during the Battle of the Bulge. (NARA)

MCNAIR'S FOLLY: THE 3IN GUN

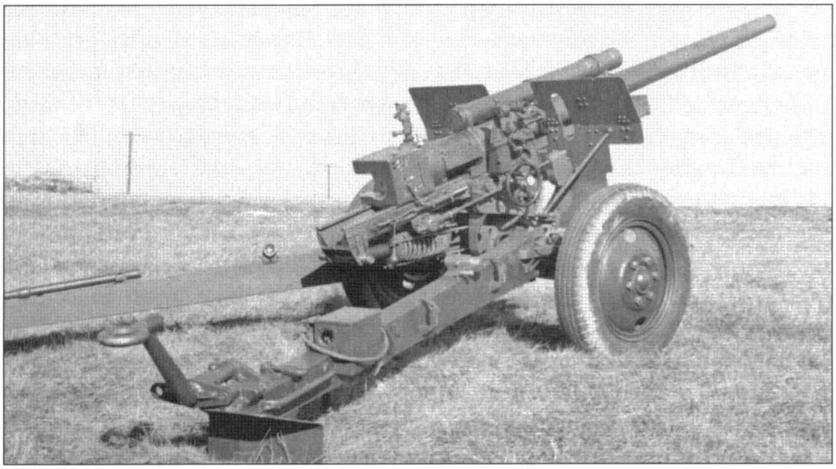
In parallel to efforts to field an expedient 75mm anti-tank gun in 1940, Ordnance also began a program to employ a heavier anti-tank gun. The recently standardized Carriage M2 for the new 105mm howitzer seemed a likely candidate, and was combined with the 3in tube from the T9 anti-aircraft gun to create the 3in Gun T10, recoil mechanism T5 and carriage T1. The design underwent considerable refinement prior to the construction of a pilot, which arrived at APG in September 1941. The weapon was so much better than the expedient 75mm anti-tank guns being converted at the time that the War Department authorized the immediate manufacture of 100. A further set of tests by the Field Artillery Board (FAB) at Ft Bragg uncovered numerous small deficiencies that were laid out in a March 1942 report. In May 1942 the combat arms asked for cancellation of the project: the new Tank Destroyer branch did not want a towed 3in gun, insisting on a self-propelled weapon, while the Infantry was aghast at its size and weight. The Chief of Ordnance declared the cancellation by the AGF to be a "deplorable and definite mistake in view of recent executions of the 88mm in Libya." The head of Army Ground Forces, Gen Lesley McNair, was an artilleryman who had long favored towed anti-tank guns over self-propelled guns, which he felt to be a waste of money. As a result of his pressure, in August 1942 the requirement re-emerged and the AGF supported the procurement of 1,000 3in anti-tank guns with no specific decision on who would use them once manufactured. Over the objections of the head of the Tank Destroyer Center, Gen A. D. Bruce, a 3in gun was sent to Ft Hood for further trials in September 1942. Most of their recommendations were ignored.

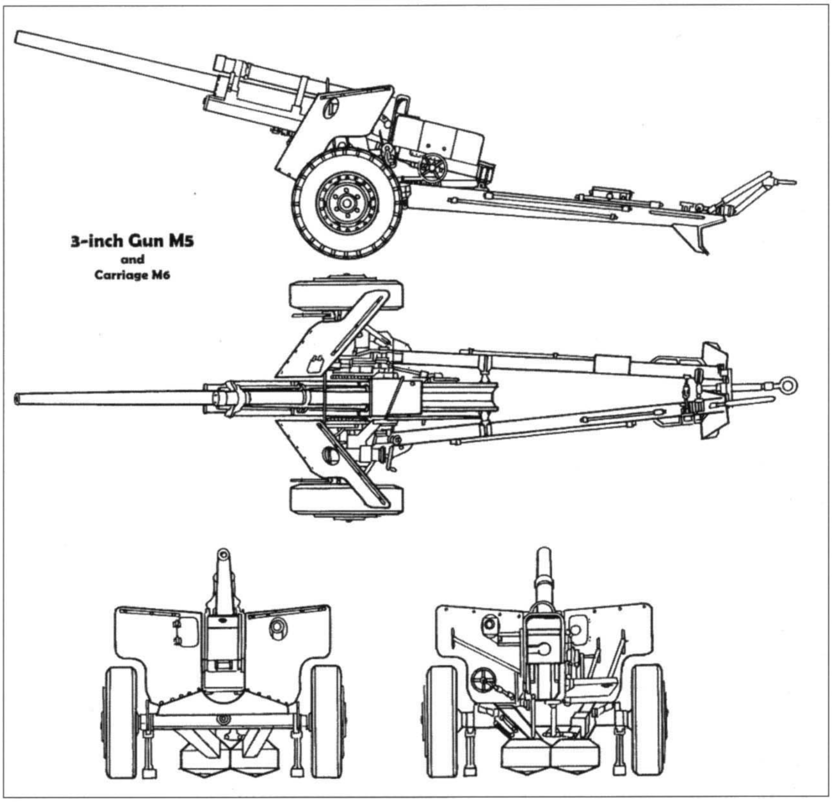
Production of the first batch of 1,000 guns began in December 1942 as the 3in Anti-tank Gun M5 on Carriage M1. On August 22, 1942, McNair ordered the Tank Destroyer Center to restudy the issue of towed anti-tank guns, noting that they could be unloaded at ports that could not handle heavy tracked vehicles. Gen Bruce adamantly opposed the concept, arguing that a towed battalion required not only 300 more men than a self-propelled battalion, but also more shipping space, since it involved not only the towed gun but its prime mover as well. However, McNair stubbornly persisted and argued that experiences in the North African campaign indicated that the towed anti-tank gun had been proved a successful adversary of the tank. Rank won out and McNair's opinions triumphed, even if his assessments of the North African campaign were dubious. On January 1, 1943 McNair ordered Bruce to test a towed battalion, and the 801st Tank Destroyer Battalion served as the guinea pig. The trials resulted in a tentative organization and on March 31, 1943 McNair ordered the conversion of 15 self-propelled battalions into towed battalions. This was formalized under a new TO&E on May 7, 1943. To keep the battalion size down, the reconnaissance platoon was eliminated. In November 1943, McNair ordered that half of all tank destroyer battalions would be converted to towed configuration in time for the forthcoming campaign in France. During the fall 1943 Louisiana war games, the newly converted 823d Tank Destroyer Battalion was attached to several different divisions to show them the uses and limitations of the new formation.


The 57mm anti-tank gun was issued with a pair of splinter shields that could be erected on either side of the gun to provide the crew with additional protection. They were awkward to employ in combat and were seldom used. They are seen here at a weapons display in Washington in February 1944. (MHI)

While these arguments were going on the final modifications to the 3in gun were completed, which included a new shield. Although the original plan was to designate the modified design as the Carriage M1A1, in November 1943 it was standardized as the 3in Anti-tank gun M5 on Carriage M6. The M6 carriage was easily distinguishable from the M1 carriage due to the use of a new sloped shield, while the M1 carriage was fitted with a flat shield from the 105mm howitzer. A second production batch of 500 guns was ordered and these were delivered in November–December 1943. In January 1944 the AGF requested that the first batch of 3in anti-tank guns completed with the M1 carriage be re-manufactured with the M6 carriage configuration. Except for a handful of the early guns sent to Italy in late 1943, all towed anti-tank gun battalions deployed to Europe were equipped with the M6 carriage.

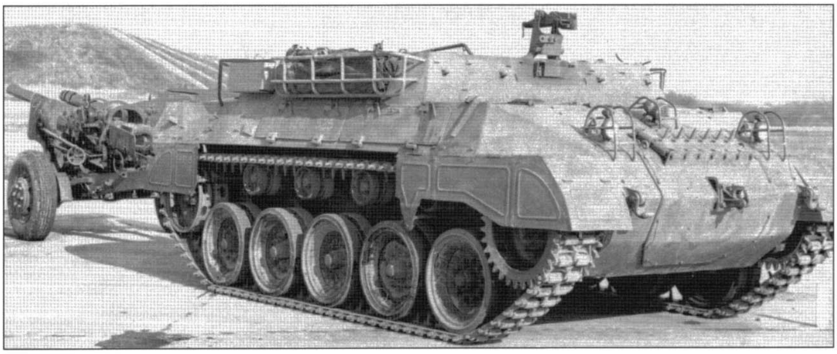
A variety of vehicles were considered to serve as the prime mover for the 3in gun, but it was the M3 half-track that was finally selected. In 1944, after complaints about the half-track, the new M39 armored utility vehicle was selected to replace it, and this became official under the


The 3in anti-tank gun was developed by mating a 3in anti-aircraft gun tube to the carriage and recoil mechanism of the new 105mm howitzer. Here the pilot 3in T10 gun on T1 carriage is shown during trials at APG in November 1941. (USAOM)



1 September 1944 TO&E. However, the M39 AUV did not become available until the spring of 1945, by which time few towed battalions were still in service.

In comparison to contemporary anti-tank guns being developed in Europe, the US 3in anti-tank gun was a mediocre design. It was extremely heavy and clumsy, and this was compounded by indifferent anti-tank performance. Britain began developing its own anti-tank gun in this caliber, the 17-pdr anti-tank gun, in November 1940, while Germany began work on the 75mm PaK 40 in 1939, which entered service in early 1942. In terms of its size and weight, the German gun was designed to be as compact as possible; the carriage was specially designed rather than quickly adapted from an existing howitzer carriage, as was the case with the US gun. The British 17-pdr was as big and clumsy as the US gun, but had substantially better anti-armor performance. The significant difference in armor penetration between the two weapons was the relatively small size of the propellant charge in the US gun: the British 17-pdr used 9lb of propellant compared to only 3lb 10oz of propellant for the US 3in round. US artillery design tended to be conservative, avoiding high chamber pressures because of the resultant erosion problems and shorter barrel life. The underlying problem was that the US Army in 1943 was still technologically inexperienced and did not fully appreciate the future tank threat. Anti-tank requirements were shaped by the mistaken belief that the tank threat that would be faced in France in 1944 would be essentially the same as that encountered in Italy in 1943. Although the Panther tank appeared in combat for the first time in the summer of 1943, the US



Tank destroyer battalions were authorized to deploy the new M39 armored utility vehicle as the prime mover for the 3in anti-tank gun in September 1944. However, the M39 did not begin to arrive in Europe until April 1945, by which time most of the towed battalions had been converted to self-propelled battalions. (Patton Museum)

assumed that it was another heavy tank like the Tiger, which would only be deployed in small numbers. It was not until the spring of 1944 that the Army's technical intelligence began to realize that the Panther was, in fact, a medium tank replacement for the ubiquitous PzKpfw IV, and would soon form the core of the panzer force. This revised assessment did not penetrate the Army prior to the Normandy landings, and it wasn't until the shock of combat in June 1944 that the Army finally realized the inadequacies of its anti-tank guns.

COMPARATIVE ANTI-TANK GUN PERFORMANCE

	75mm PaK 40	3in	17-pdr
Combat weight (lbs)	3,306	4,875	4,624
Barrel length (caliber)	L/48	L/50	L/55
Ammunition type	PzGr 39 APCBC	M62 APC	APCBC
Initial muzzle velocity (fps)	2,460	2,600	2,900
Penetration (mm/500m, 0 degrees)	123	115	163

THE 76MM ANTI-TANK GUN

While the Tank Destroyer Center and the AGF were locking horns over the towed 3in gun, Ordnance was working on a more modern 76mm gun. The origins of this weapon are curious. In December 1942 the head of the Armored Force, Gen Jacob Devers, visited the North African theater on a fact-finding mission. While discussing armored tactics with British officers, Devers was told of a German tactic that was used in the desert campaign: a small force of panzers would lure British tanks forward, where they would stumble onto a number of concealed 50mm anti-tank guns. On returning to the United States, Devers asked Ordnance to design a towed anti-tank gun using the same M1 76mm gun being developed for the M4 medium tank. His idea was to have the M4 (76mm) tanks advance into German territory towing guns, which would be left in defensive positions while the M4 tanks lured panzers after them; the anti-tank guns would then ambush the panzers. These tactics were extremely contrived, but Ordnance took on the project as the T2 76mm gun on carriage T3. Several versions were developed through 1944, but after Devers left the Armored Force later in 1943 interest in the weapon declined. The program was canceled in 1945 at the end of the war.

US ANTI-TANK GUN PRODUCTION 1940–45

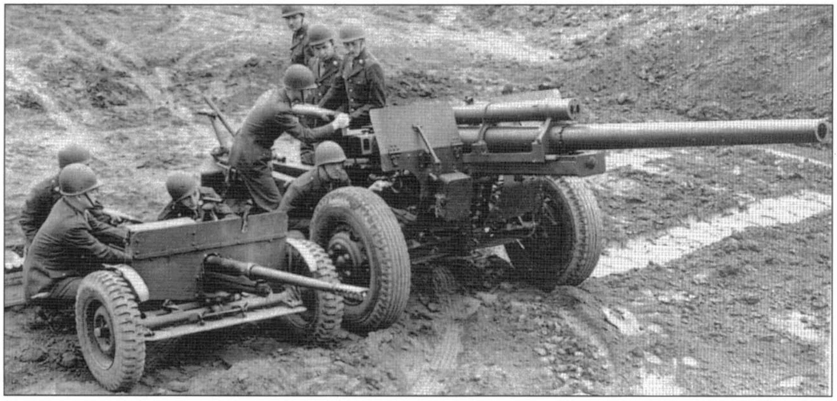
	37mm	57mm	75mm	3in	90mm
1940	340		234		
1941	2,252		684		
1942	11,812	3,877		250	
1943	4,298	5,856		1,250	
1944		3,902		1,000	3
1945		2,002			197
Total	18,702	15,637	918	2,500	200

ANTI-TANK COMBAT IN ITALY

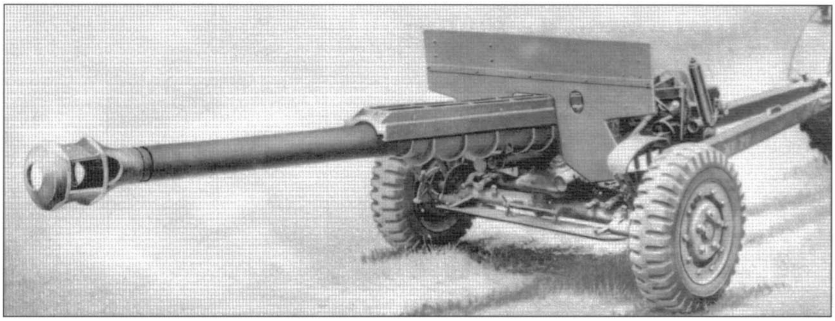
At the time of the Allied landings in Sicily on July 10 1943, US Army infantry divisions were still in the process of converting from the 37mm to the 57mm gun, and both types saw combat use. The beachhead at Gela was subjected to repeated tank attacks, first by Renault R-35 tanks of the Italian 101st Battalion, 131st Tank Regiment.

About ten Renault tanks survived a heavy naval bombardment and broke into the town where Rangers from Col Darby's Force X confronted them. The Rangers fought the tanks with the few bazookas that were handy, while others dropped grenades on the tanks from rooftops. During this fighting, Col Darby took a jeep back to the landing beach, located a 37mm anti-tank gun, and put it into action against the Italian tanks. Darby personally knocked out several of the Renaults with the 37mm gun, and within 20 minutes the Italian attack had failed and the stragglers retreated out of the town.

Later in the day an attack was launched by the far more powerful Herman Göring Panzer Division, which included Tiger tanks. The panzers confronted the 1/16th Infantry of the 1st Infantry Division, whose 37mm guns could do little against the heavily armored Tigers, and the battalion commander, LtCol Charles Denholm, was wounded while personally manning one of the surviving guns. After a half-hour of fighting the entire regiment was engulfed, and only three 37mm anti-tank guns with the regimental anti-tank company were still operational. The attack was finally beaten off with the support of field artillery and naval gunfire, but it highlighted the need for a better anti-tank gun for infantry defense.



The infantry had no interest in the 3in gun M5 on carriage M1 because of its excessive size and weight. It is seen here next to the infantry 37mm anti-tank gun. It is worth noting that the M3A1 37mm gun here is fitted with one of the rarely seen Solothurn-style muzzle brakes. (NARA)



The 76mm gun M1 on the T2 carriage was a short-lived effort to develop a lightweight anti-tank gun for the Armored Force. Its planned employment was based on contrived tactics, and the program was quickly canceled. Nevertheless, it had some distinct advantages over the standard 3in gun, being significantly lighter and less conspicuous. (NARA)

Patton's report after the Sicilian campaign noted:

> If a projectile can be developed for the 37mm gun with more penetrating effect, it is superior to the 57mm as an offensive anti-tank weapon … it can be pulled by the low relief ¼-ton truck (while) the 57mm cannot and must be towed either by a half-track or a high relief ¾-ton truck. Second, with limited crews available, the 57mm cannot be manhandled any distance over bad country while the 37mm can. Even with the present ammunition, the 37mm is deadly against tanks up to 400yds.

Patton's views were not, however, widely shared by the Infantry.

The lack of 57mm guns remained a problem during the subsequent fighting by Gen Mark Clark's Fifth Army on the Italian mainland. Even at the time of the Salerno landings in September 1943 few infantry regiments had the 57mm gun, and since the Italian theater did not have priority for equipment, the replacement program was slow. Efforts were made to bolster the number in service by the time of the Anzio break-out operations in the late spring, and the 57mm gun finally began to outnumber the 37mm gun by summer. However, the 37mm gun remained in service with the Fifth Army much later than in North-West Europe, and some were still in use at the end of 1944.

The first 3in anti-tank guns arrived in Italy in October 1943 with the 805th Tank Destroyer Battalion; they were first used in combat on the Volturno–Cassino front, and later during the Anzio and Rome campaigns. As would be the case in France, infantry divisional commanders were very

A 57mm gun crew sets up an ambush position during Operation *Cobra*, the effort to break out of Normandy that began on July 24, 1944. The US Army in France did not commonly use camouflage suits, and the experiment with the 41st Armored Infantry of the 2d Armored Division, seen here, ended in August after confusion with the German camouflage battledress. (NARA)

unhappy about using the towed guns rather than the self-propelled battalions. The 805th Tank Destroyer Battalion was converted to an M18 76mm GMC battalion in July 1944 after the Anzio operation. A Fifth Army tank destroyer conference held in Florence in November 1944 reported back to Washington:

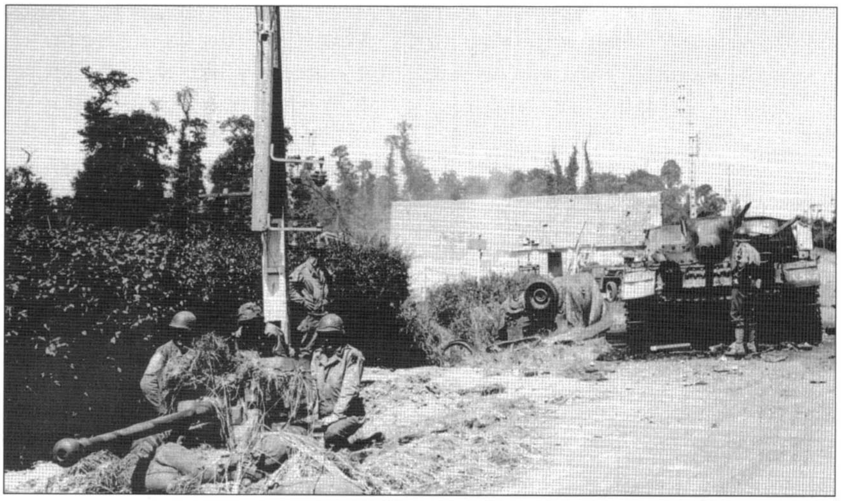
> The conference is unanimous in the opinion that the towed battalion was unsatisfactory and grossly inferior to the SP-gun. It cannot be manned effectively in the forward combat area. Men cannot and will not stay with towed guns as they will with the M10 or M18.

As a result, the number of towed battalions remained small, and by the end of the campaign there was only one towed unit still in Italy. Some sense of the relative importance of the different types of guns in Italy can be garnered from the loss data. The number of anti-tank guns lost by the Fifth Army from September 9, 1943 to May 9, 1945 was 167 37mm guns, 259 57mm guns, and 58 3in guns.

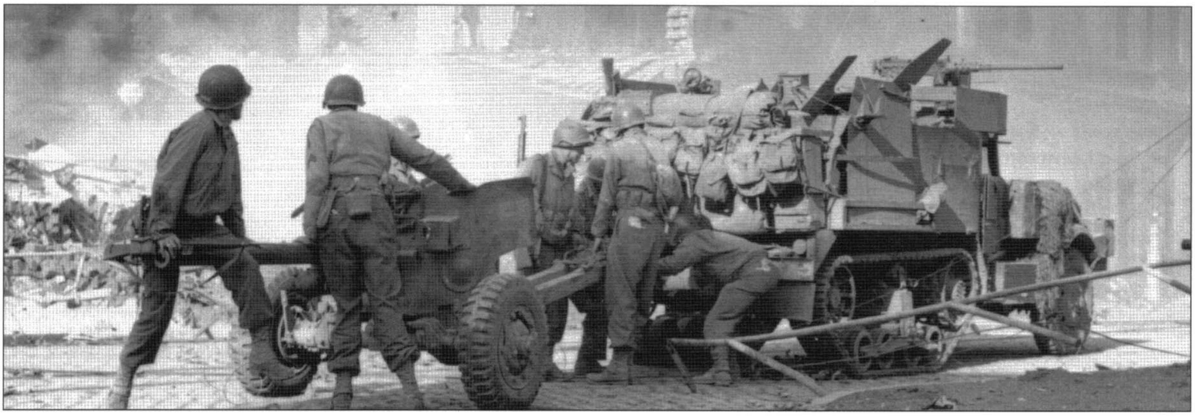
ANTI-TANK COMBAT IN FRANCE

At the time of the D-Day landings in Normandy there were 30 tank destroyer battalions in England, of which 11 were towed and 19 self-propelled. The practice was usually to assign a single towed tank destroyer battalion to each infantry division, to supplement their organic 57mm anti-tank gun units.

The 57mm anti-tank guns were the first to see extensive combat use. The Airborne Command had earlier rejected the use of the 57mm gun due to the difficulty of air-landing the weapon using gliders. Since the October 1942 TO&E, the Airborne Division had 36 37mm anti-tank guns: eight in its glider infantry regiment, four in divisional artillery and 24 in its anti-aircraft battalion. On paper, this remained the same under the February 1944 TO&E. However, the paratroopers recognized the shortcomings of the 37mm gun, and noticed that the British airborne



The first 57mm anti-tank guns in action in France were those delivered by glider for the 82d and 101st Airborne Division on D-Day. They were not the standard US Army 57mm gun, but the British 6-pdr Mk. III gun, a special lightweight airborne version not manufactured in the United States. Behind this anti-tank gun of the 82d Airborne is one of the StuG IV assault guns of the 17.SS-Panzer Division that was knocked out during the fighting outside Carentan on June 13, 1944. (NARA)

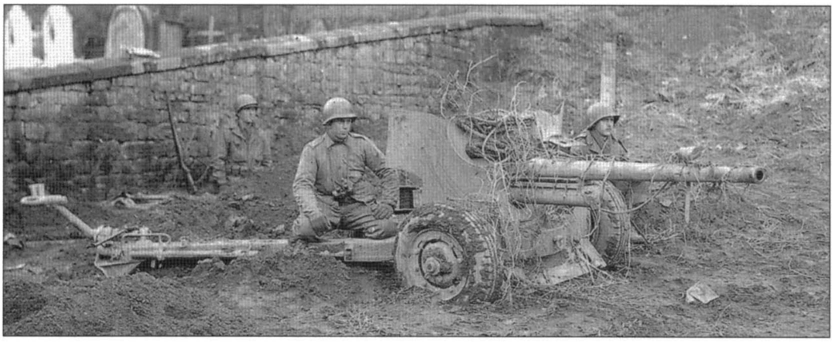


A 57mm anti-tank gun crew detaches it from its prime mover, an M2A1 half-track, during the street fighting in Aachen on October 15, 1944. The 57mm gun was issued with armor shields that could be deployed on either side of the gun, and these can be seen stowed on the sides of the half-track. In practice, the shields were not widely used. (NARA)

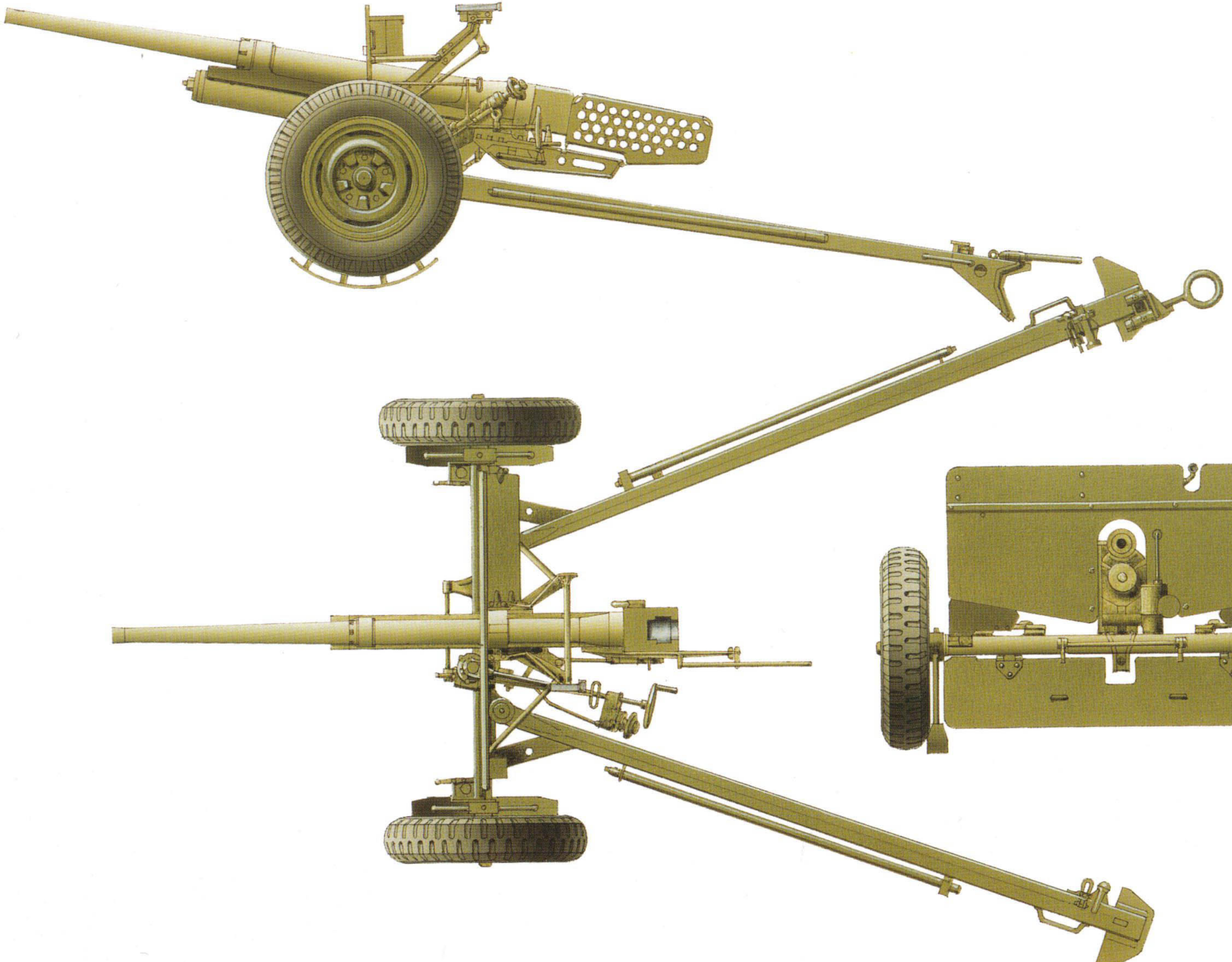
divisions had begun receiving a lightweight derivative of the 6-pdr anti-tank gun on the new Carriage Mk. III, which was narrow enough to fit into the Horsa glider. US forces acquired enough of these to re-equip the two airborne divisions taking part in the Normandy drops. The 6-pdr Mk. III carriages were referred to as 57mm guns, but they did not receive a specific US designation. For the Normandy airdrops, both the 82d and 101st Airborne Divisions deployed 33 of these guns, nine in the glider infantry regiment and 24 in the AA battalion. They were used in the initial fighting around Ste. Mère Eglise on June 6 and proved very effective in repulsing attacks by German StuG III assault guns. The paratroopers also used them with some success in repulsing the attack by StuG. IV assault guns at Carentan on June 13.

US infantry divisions taking part in the landings began using their anti-tank guns in the days following the landings, even though they encountered relatively few German tanks for the first month of the Normandy campaign. More often than not, they were used in an "accompanying gun" role, that is, being used for direct fire support. The 57mm gun was not as useful as the 37mm gun in this role because of the shortage of high explosive ammunition. The First Army managed to obtain a "sufficient" supply of 6-pdr high explosive ammunition from the British, but it generally remained scarce. A battalion commander noted,

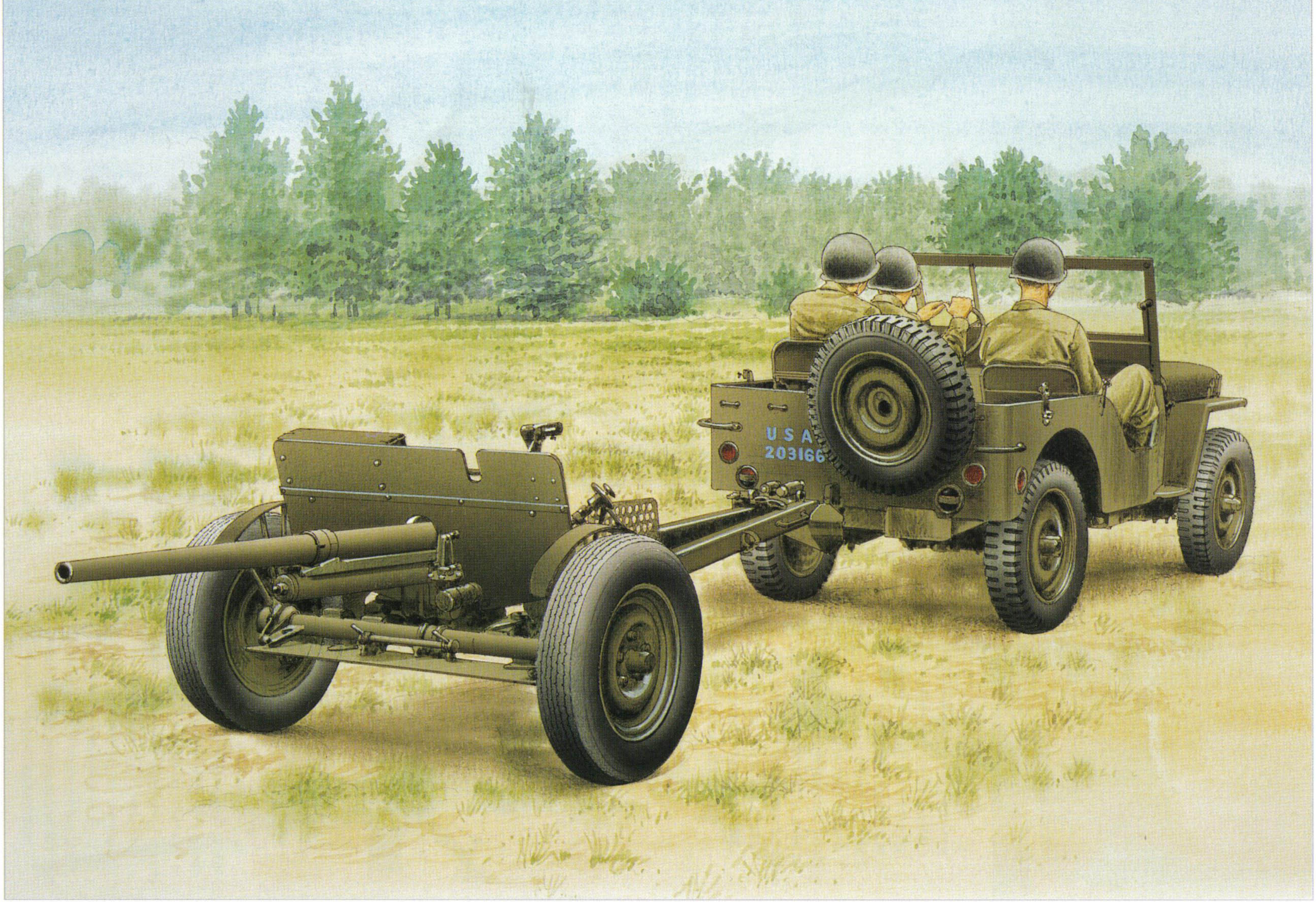
> We sure need high explosive for the 57mm. It is the only weapon in the infantry regiment with the flat trajectory like the 88, but there is no high explosive for it except for what we borrowed from



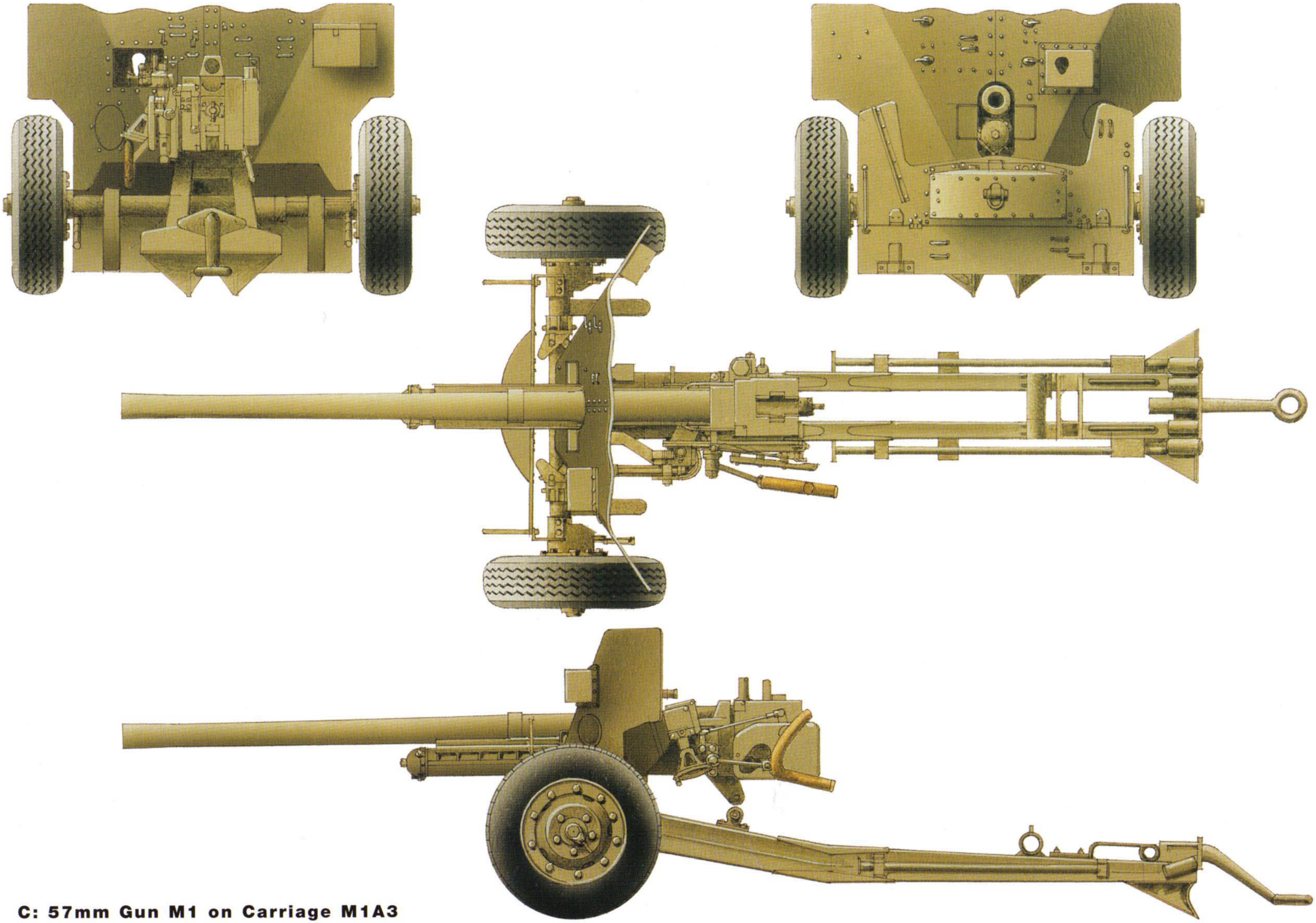
The crew of a 57mm gun of the 77th Infantry's Regimental anti-tank company camouflage their gun on the outskirts of a cemetery near Sierthal, France, on December 17, 1944. The drawbar lunette for towing evident in this view is a distinctive feature of the guns built for US service; the M1 and M1A1 carriage lacked this feature. (NARA)



A: 37mm Anti-tank Gun M3 on Carriage M4

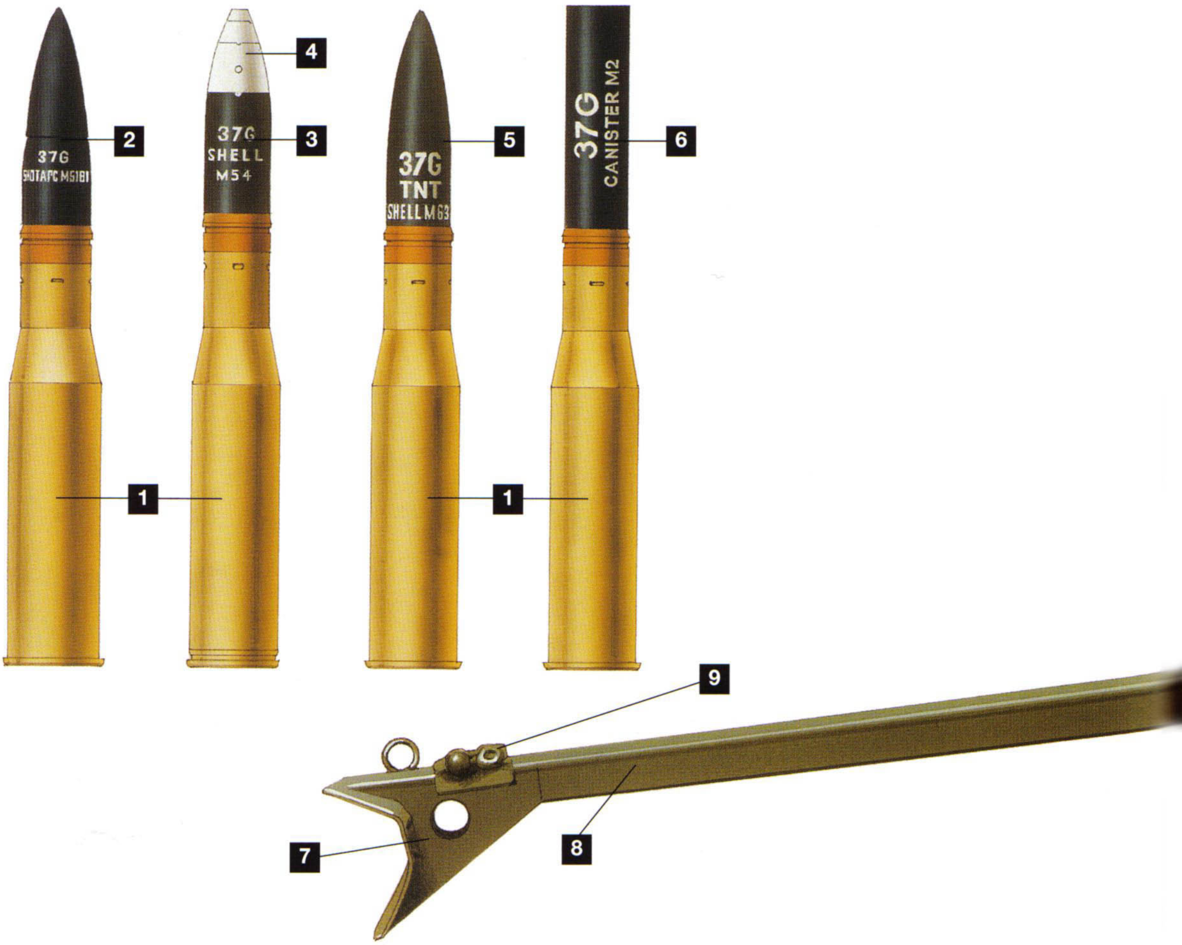


B: Jeep and 37mm anti-tank gun, Infantry School, Ft Benning, Georgia, 1942



C: 57mm Gun M1 on Carriage M1A3

D: 37MM ANTI-TANK GUN M3A1 ON CARRIAGE M4A1

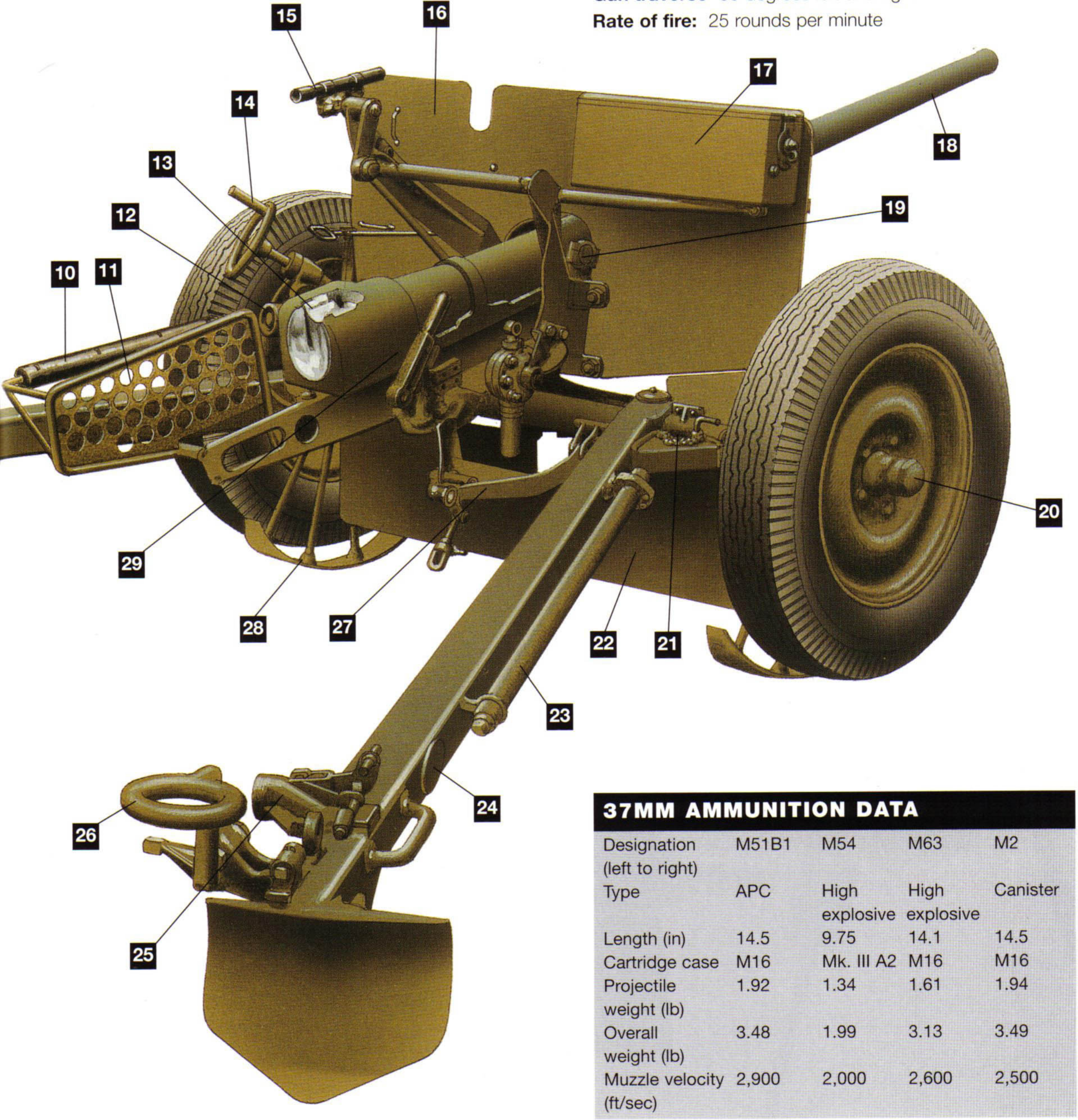

4
2
37G
SHOT APC M51B1
3
37G
SHELL
M54
5
37G
TNT
SHELL M63
6
37G
CANISTER M2
1
1
9
7
8

KEY

1 37mm Cartridge case M16
2 37mm APC (Armor Piercing Capped) Shot M51B1
3 37mm M54 High Explosive Shell
4 M56 PD (Point Detonating) Fuze
5 37mm M63 High Explosive Shell
6 37mm M2 Canister
7 Gun spade
8 Trail
9 Trail lock loop
10 Shoulder guard guide
11 Shoulder guard
12 Traverse knob
13 Gun breech
14 Elevating knob
15 Telescopic sight
16 Gun shield
17 Tool case
18 Gun tube
19 Trunnion
20 Wheel hub
21 Trail lock pin
22 Apron
23 Rammer
24 Manufacturer's data plate
25 Trail lock
26 Lunette
27 Traveling lock
28 Wheel segment (for rigidly emplacing gun)
29 Breech handle

37mm GUN TECHNICAL DATA

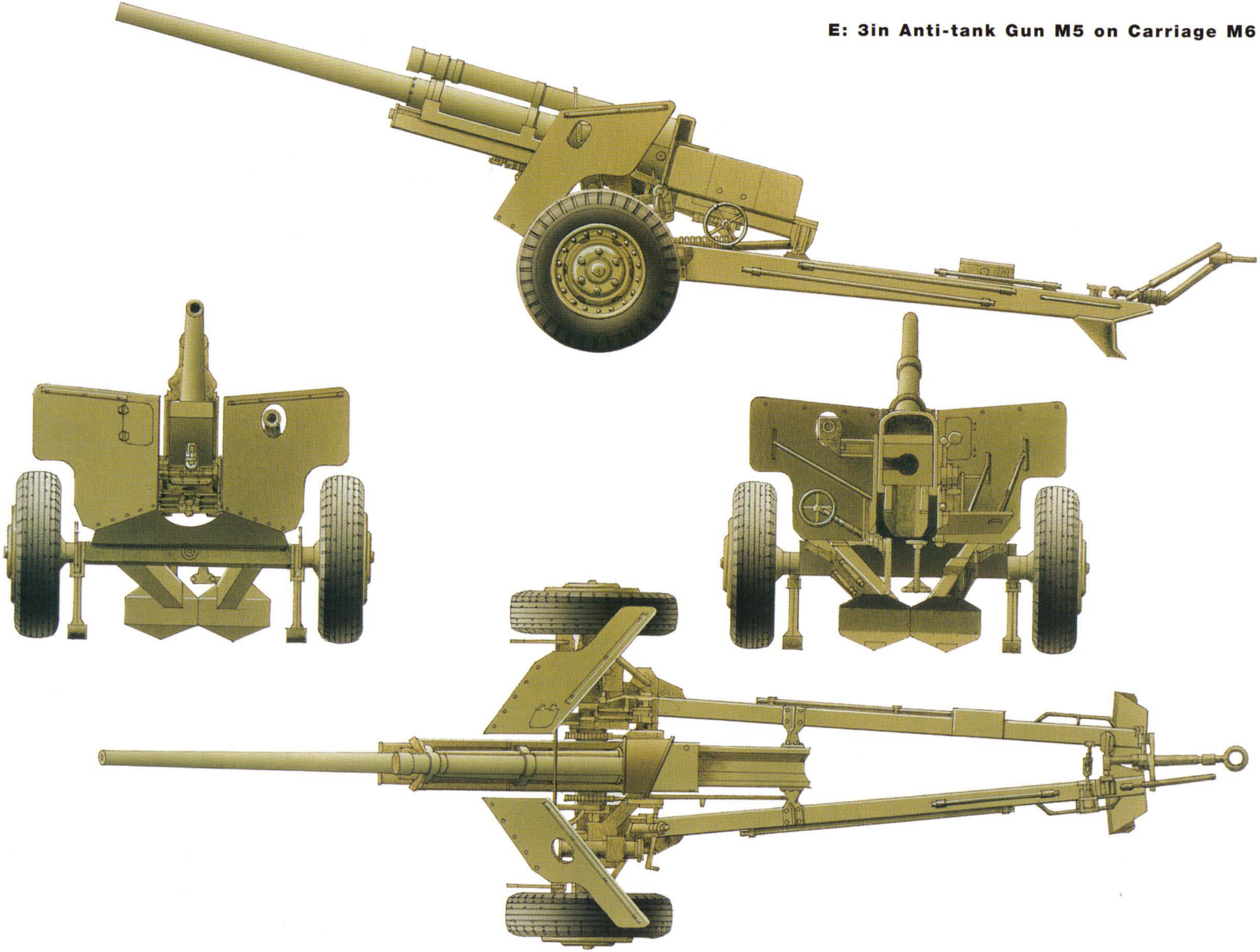
Length: 154.5in
Width: 63.5in
Height: 37.8in
Weight: 912lb
Length of gun bore: 53.5-cal. (70in)
Breech type: drop block
Recoil mechanism: hydrospring
Gun elevation: -10 to +15 degrees
Gun traverse 30 degrees left and right
Rate of fire: 25 rounds per minute



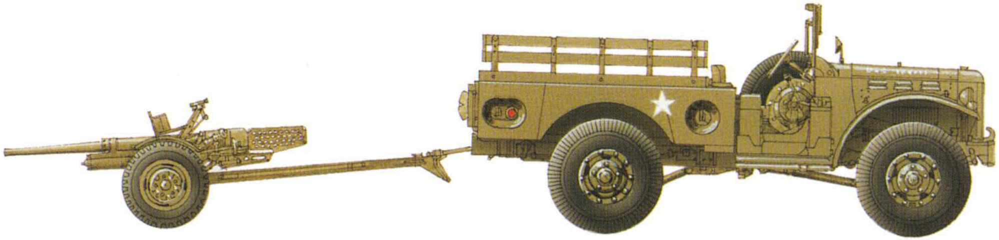
37MM AMMUNITION DATA

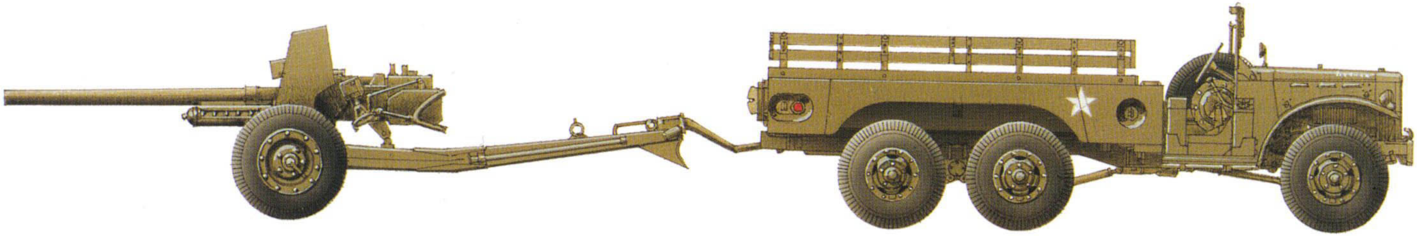
Designation (left to right)	M51B1	M54	M63	M2
Type	APC	High explosive	High explosive	Canister
Length (in)	14.5	9.75	14.1	14.5
Cartridge case	M16	Mk. III A2	M16	M16
Projectile weight (lb)	1.92	1.34	1.61	1.94
Overall weight (lb)	3.48	1.99	3.13	3.49
Muzzle velocity (ft/sec)	2,900	2,000	2,600	2,500

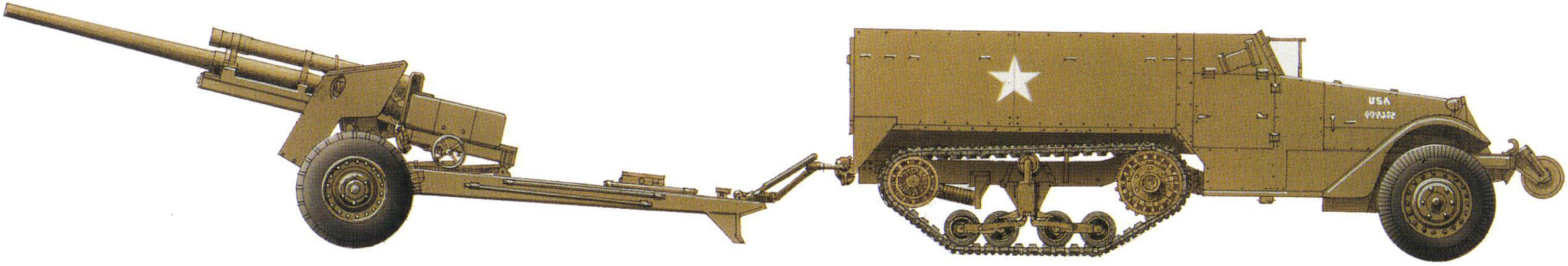
E: 3in Anti-tank Gun M5 on Carriage M6

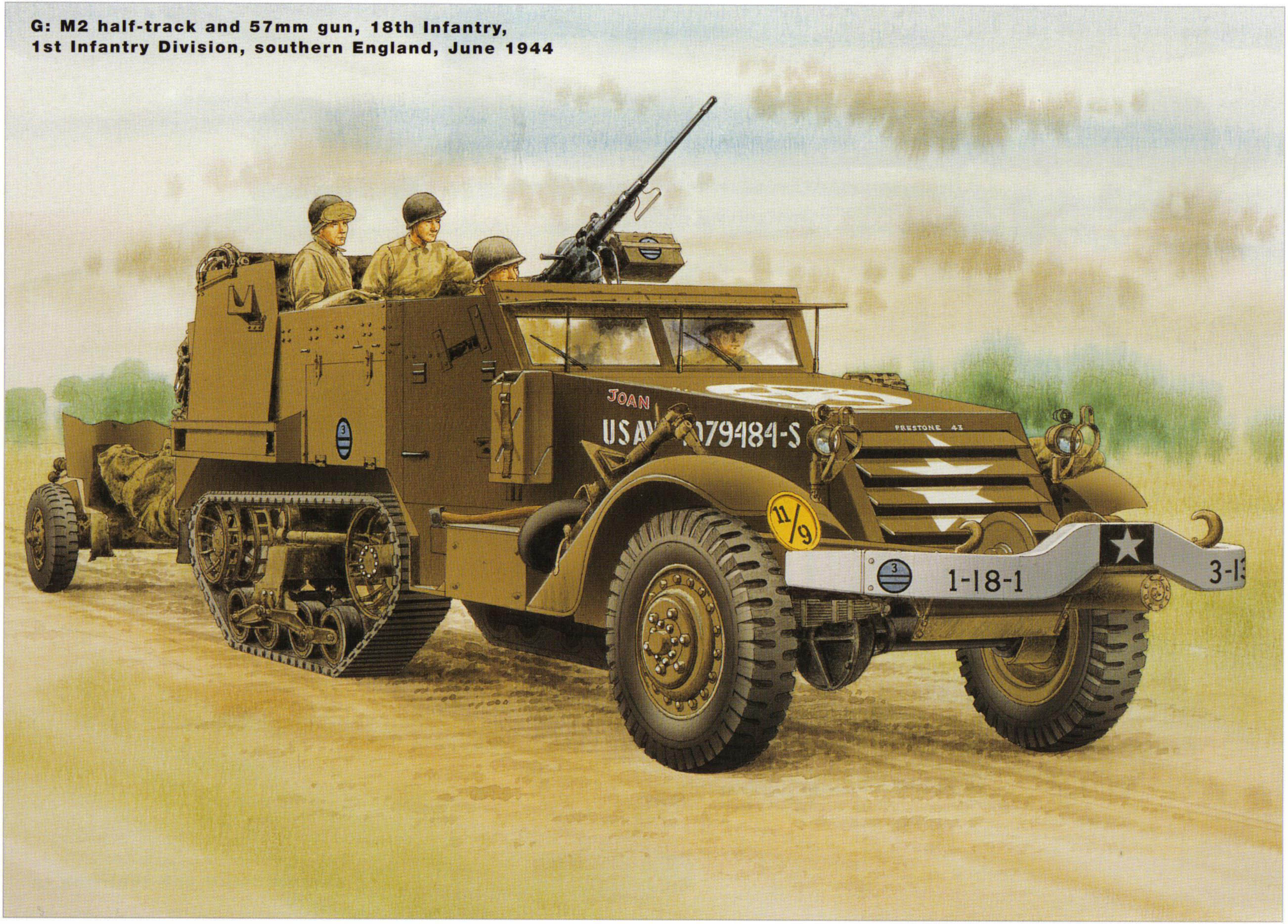


F: Anti-tank gun prime movers









G: M2 half-track and 57mm gun, 18th Infantry, 1st Infantry Division, southern England, June 1944

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The constricted hedgerow terrain of Normandy, known as *bocage*, presented significant difficulties in deploying anti-tank guns, as the hedges often rose over the height of the gun barrel and restricted traverse. This 57mm gun is seen deployed behind a hedgerow during the Normandy fighting in July 1944. (NARA)

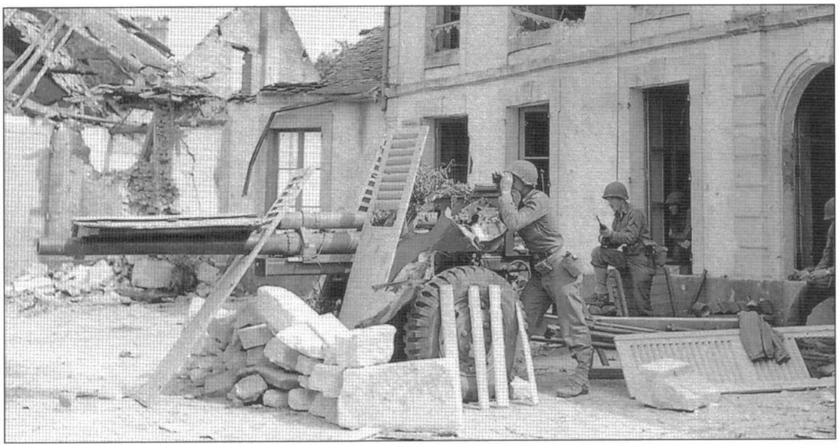
> the British. As a result, in the absence of tanks but the presence of pillboxes, we haven't used the 57mm very much.

On July 3 1944 MajGen Manton Eddy, commander of VII Corps, sent a report to Washington on lessons learned from the initial Normandy fighting. He concluded that the

> towed 57mm guns were virtually useless in the close country encountered. Such weapons assigned to the (regimental) anti-tank companies certainly should be some type of self-propelled mount and probably those assigned to battalions. The present gun cannot be placed in position sufficiently promptly, except along roads.

The first major use of German armor after the initial fighting at Ste. Mère Eglise and Carentan was an attack towards Isigny by the Panzer Lehr Division on July 11–12. The 57mm anti-tank guns of 2/39th Infantry, 9th Division, working in conjunction with bazooka teams, managed to tie down the Panther tanks while the M10 3in GMC of the 899th Tank Destroyer Battalion moved into position. A total of 16 PzKpfw IV and Panthers were knocked out, stopping the attack. This first major encounter with the Panther proved to be an unpleasant shock, since the thick frontal armor proved impervious to either 57mm or 3in projectiles. The Panther mantlet was vulnerable to 3in gunfire at close ranges of 100 to 300yds, but the 57mm gun could not penetrate the Panther frontally, only from the sides. There were still small quantities of 37mm anti-tank guns in Normandy, often used by units that had kept them even after receiving the 57mm gun. The limitations of these guns soon became apparent, and they disappeared later in the summer.

Problems began to emerge almost immediately with the 3in gun battalions. The piece was so heavy that it proved very difficult to move in the Normandy *bocage* (hedgerows). Once the gun had been moved into position by its half-track, the gun crews had a difficult time placing it in a firing position because of the height of the hedgerows; at least the 57mm gun was light enough to be manhandled into position. Besides being clumsy to deploy, the 3in gun was large and difficult to conceal, and crews were often subjected to small arms and mortar fire. The gun shield did not provide adequate protection in these circumstances. In contrast, the



A camouflaged 3in gun in its defensive position during the fighting in northern France on August 19, 1944. The inadequate performance of the 3in gun against the German Panther, as well as its lack of mobility, led the US commanders in Europe to insist that it be replaced by a 90mm gun as soon as possible. (NARA)

self-propelled M10 3in gun motor carriage proved much more mobile in the bocage, and its armor gave the crew better protection. In addition, infantry commanders appreciated the psychological boost that the presence of the self-propelled tank destroyers had for their troops. During the hedgerow fighting, there were few occasions when the towed guns were used in their intended anti-tank role. Most of the fighting for the first two months of the campaign was a close combat infantry struggle. As a result, it became standard policy in most battalions of the First Army to leave only two companies for anti-tank defense and leave one company behind the lines in the field artillery role.

The problems with the inadequate penetration of the 3in gun led to improvised solutions. During the Panzer Lehr Division attack in mid-July, a small number of 90mm anti-aircraft guns had been positioned for anti-tank defense. Later in the summer, the First US Army formalized this option, and assigned a 90mm anti-aircraft battalion to each corps for anti-tank defense. Usually, these were put under control of the corps' tank destroyer group headquarters. In the event, there were few other occasions during the summer and fall when the 90mm guns were actually used against German tank attacks. Instead, the 90mm battalions were generally used as field artillery and a First Army report indicated, "very satisfying results were obtained by using this weapon for long range harassing and interdiction fires beyond the capabilities of divisional artillery."

The 57mm anti-tank gun played a crucial role in the defeat of Operation *Luttich*, Hitler's attempt in August 1944 to stage a panzer offensive to the sea in response to Operation *Cobra*. This well-camouflaged 57mm gun is from the 12th Infantry, 4th Division that covered the shoulder of the attack on Mortain. (NARA)

A 57mm gun of the 1/39th Infantry, 9th Division is camouflaged behind wooden debris during the fighting around Cherence le Roussel on August 6, 1944. The battalion received a Distinguished Unit Citation for its defensive actions against Operation *Luttich*. (NARA)

The next major test of the anti-tank guns came in August, when Hitler ordered a panzer counter-offensive, Operation *Luttich,* towards Avranches. The panzer spearhead struck the 30th Infantry Division near the town of Mortain, while other elements of the attacking force hit the 1/39th Infantry, 9th Division near Cherence le Roussel. Once again, the combination of 57mm guns and bazooka teams helped to bolster the infantry defense and stem the attack. Some towed 3in guns from the 823d Tank Destroyer Battalion also took part in the fighting. While the infantry was not happy about the inability of the 57mm gun to penetrate the Panther tank frontally, the fighting at Mortain made it clear that anti-tank guns embedded in a stout infantry defense could stop a panzer attack.

The First Army report noted that the fighting at Mortain

> demonstrated the superiority of the self-propelled battalion over the towed unit in conclusive fashion by sustaining fewer losses while destroying more enemy tanks. The mobility of the self-propelled weapon permitted a more flexible and resilient defense whereas the towed gun, once in position, was unable to maneuver against targets outside its narrow sector of fire or to escape when threatened of being overrun.

The summer fighting convinced Bradley's 12th Army Group headquarters that the towed 3in gun tank destroyer battalions had significant tactical drawbacks. In a September 1944 report to Eisenhower, the headquarters firmly disagreed with the AGF's plans to deploy half of all tank destroyer battalions in this flawed configuration. Of the 52 tank destroyer battalions assigned to the theater, Bradley wanted only 12 left in the towed configuration, and only if converted to the new T5E1 90mm gun. A later survey of lessons learnt in the Normandy campaign concluded:

> The antitank rocket launcher M1A1 [bazooka] was considered to be greatly superior to the 57mm gun in the Normandy conditions, but in the hands of green, unseasoned troops, its use did not prevent enemy armor from making short, penetrating, harassing attacks at will.

THE TEST: ANTI-TANK GUNS IN THE BATTLE OF THE BULGE

While 57mm and 3in anti-tank guns remained in widespread use after the campaign in France, their use in their intended role diminished because of the absence of German armor in large numbers. More often than not, anti-tank guns were used for secondary missions. Both guns were widely used in the autumn fighting along the Siegfried Line. For example, when the 30th Infantry Division was assigned to penetrate a fully manned sector of the defenses on October 2, two companies from the attached 3in tank destroyer battalion were assigned to support one of the infantry battalions making the initial attack.

> One or two (TD) platoons were kept continually in front line positions firing at and destroying all visible pillboxes in the area of the attack. The other one or two platoons were always in the indirect fire positions firing harassing and interdiction missions. During the initial phases of the attack, two platoons from over-watching positions fired assault fire in the zone of the attack and neutralized targets of opportunity and strong points interfering with the infantry's progress.

Some idea of the use of the guns can be determined by their ammunition expenditure. In the case of the 57mm gun, about 20 percent of the 57mm ammunition used by the First Army from August 1944 to February 1945 was high explosive, while the remainder was anti-tank ammunition. In the late autumn of 1944, 57mm gun units began receiving small quantities of APDS (armor-piercing discarding sabot) ammunition. This was 6-pdr ammunition obtained from British stockpiles, rather than US ammunition. The APDS used a sub-caliber projectile within a sleeve that peeled away after leaving the barrel. This increased the muzzle velocity by nearly 50 percent, and so could penetrate 160mm of armor at 500m compared to only 112mm for the normal armor-piercing round. This ammunition was much prized for dealing with German tanks.

The Ardennes campaign in December 1944 saw the anti-tank guns put to their greatest test. Four US infantry divisions bore the brunt of the initial German attack, and there were also several towed 3in tank destroyer battalions in the area. The hapless 820th TD Battalion was assigned to the 14th Cavalry Group, thinly stretched across the Losheim Gap and at the center of the main German assault. The battalion was overrun in the first few days of fighting and lost 31 of its 36 guns. The neighboring 801st TD Battalion was assigned to the 99th Division around Krinkelt, and although it lost 15 of its guns, its sacrifice was not in vain, as it played a role in blunting the attack of the 12.SS-Panzer Division at Krinkelt-Rocherath. The initial Ardennes fighting made it quite clear that the towed anti-tank gun battalions were almost *completely ineffective when fighting German*

A 3in gun of the 614th Tank Destroyer Battalion is seen during training in France in September 1944. The US Army was still segregated in World War II; two African-American tank destroyer battalions saw combat in France in 1944–45. (NARA)

The crew of a 3in gun of the 772d Tank Destroyer Battalion swab out the barrel while supporting the 75th Division near Odrimont, Belgium, on January 13, 1945 during the final phase of the Battle of the Bulge. (NARA)

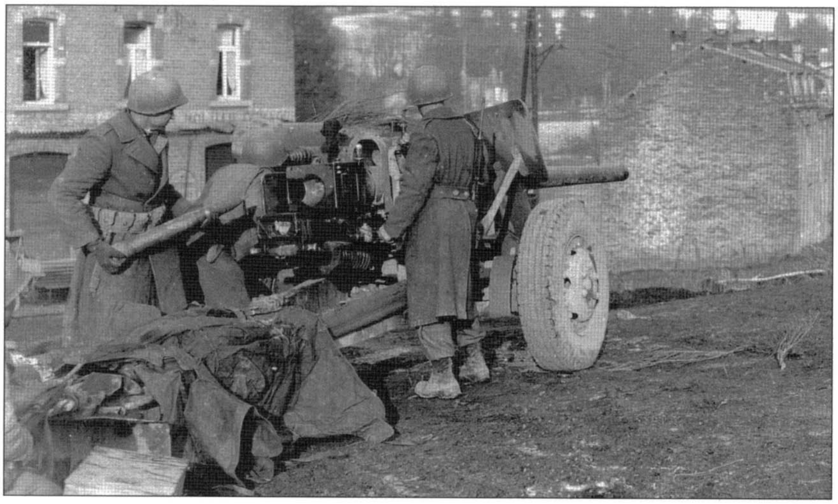
armor on their own. A later study concluded that the loss ratio in these circumstances was about 3:1 in favor of the attacking tanks. In contrast, when integrated into an infantry defensive position, the anti-tank guns were much more effective with an exchange ratio of 1:1.3 in favor of the guns.

This was also the case with the 57mm guns, which the postwar official army history pungently derided as "tank fodder". Yet in the hands of brave gunners, the 57mm guns could perform well. An excellent example was the stalwart defense of the Dom Butgenbach manor farm by the 26th Infantry, 1st Infantry Division which broke the back of the advance of the 12.SS-Panzer Division. The 57mm guns of this regiment played a critical role in the defense, even though most of its guns were knocked out in the process. (This action is described in more detail in Osprey Campaign 115: *Battle of the Ardennes (1) St. Vith and the Northern Shoulder.*)

In late January 1945, the War Department Observers Board interviewed survivors of the 2d Infantry Division who had been involved in the savage fighting in Krinkelt-Rocherath for their opinions about their anti-tank weapons. LtCol McKinley, commander of the 1/9th Infantry, lost more than half his troops defending the Lausdell crossroads on the approaches into Krinkelt-Rocherath, many when their trenches were overrun by German tanks. He noted quite bluntly:

> The 57mm guns have no place in the infantry battalion. You can't put them where you need them. In the last operation, the 57mm guns could not be moved on the roads available to me due to deep mud and direct observation by the enemy.

A regimental officer noted, "Our anti-tank company and our regiment have lost confidence in the 57mm gun as an anti-tank weapon, but our people strongly favor the bazooka for anti-tank work."



A 3in gun defends a roadblock near Vielsalm, Belgium, on December 23, 1944 during the 7th Armored Division's attempt to withdraw out of the St. Vith salient. It is obvious that the gun has been hastily emplaced as the wheel segments, used to steady the carriage, have not been locked down. (NARA)

A grim reminder of the heavy losses of towed 3in guns in the Ardennes fighting. This 3in anti-tank gun from a tank destroyer battalion with the 4th Cavalry Group lays wrecked at a crossroads outside Humain on December 28, 1944, after it was put out of action by a German tank by a direct hit to its gun shield. This battalion was credited with knocking out 15 German tanks during the intense fighting around Humain against 9.Panzer Div. after Christmas. (NARA)

A regimental anti-tank company commander noted,

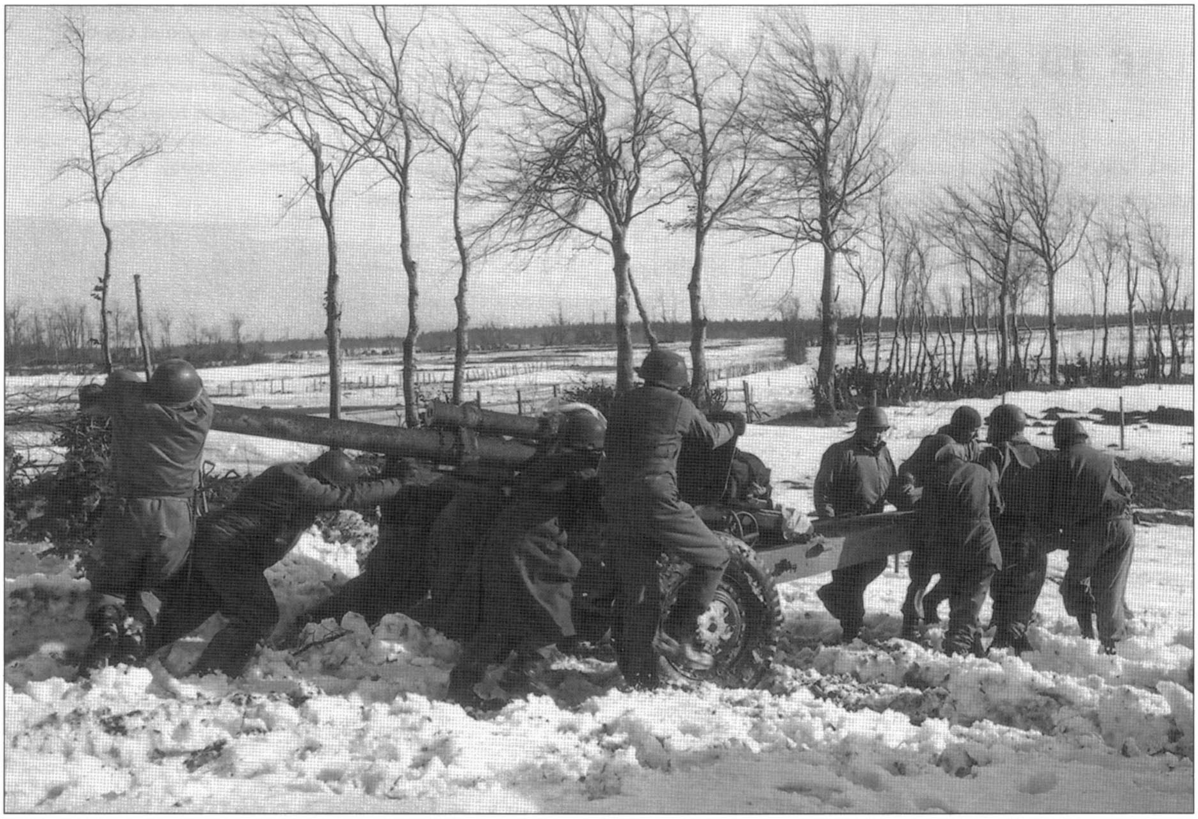
> I believe that the regimental anti-tank company should have 90mm M36 SPMs [self-propelled mounts]. I want the self-propelled guns rather than the towed 3in guns because the towed guns are too heavy and sluggish. You can't get them up to the front. My orders have been in almost every case to get the guns up to the front-line troops. I just couldn't do it in the daytime with the 3in towed gun. I can get the 57s up pretty well, but you can always get self-propelled guns up better than towed ones. I have to take an open truck up under small arms and artillery fire, which is very rough.

He also noted that the 57mm gun was used as often as not for targets other than tanks, and recommended that the basic ammunition load be 25 rounds of armor-piercing, 25 rounds of high explosive and ten rounds of the new sabot anti-tank ammunition. The other officers of the 2d Division interviewed by the observers unanimously agreed that the

The Infantry was reluctant to adopt the 57mm gun due to its weight, and in the mud it could be a serious challenge for its crew. This is a gun from the 26th Infantry, 1st Division on December 17, 1944 near Butgenbach at the beginning of the Battle of the Bulge. The anti-tank guns of the 2d Battalion, 26th Infantry would play a crucial role later in the week in stopping the 12.SS-Panzer Division at Dom Butgenbach manor. (NARA) towed 57mm guns should be replaced by self-propelled guns. Losses in the 57mm gun units in the First Army in the December fighting had been brutally high: 26 percent of their total strength, compared to a monthly loss of only 6–8 percent in Normandy. Losses in the 3in towed battalions were even higher, totaling 35 percent in December alone.

The 90mm anti-aircraft gun was used as an improvised anti-tank gun on several occasions during the Ardennes fighting, especially in the northern sector around Malmedy and Spa. Large numbers of 90mm anti-aircraft guns had been stationed in the area to form a defensive barrier against V-1 missile attacks against Liège and Antwerp. In the crisis atmosphere of mid-December, the anti-aircraft section commander at First Army headquarters authorized the use of 90mm guns as anti-tank roadblocks in key sectors. These were involved in several actions against the tanks of Kampfgruppe Peiper, the spearhead of the 6.Panzer Army, around La Gleize.

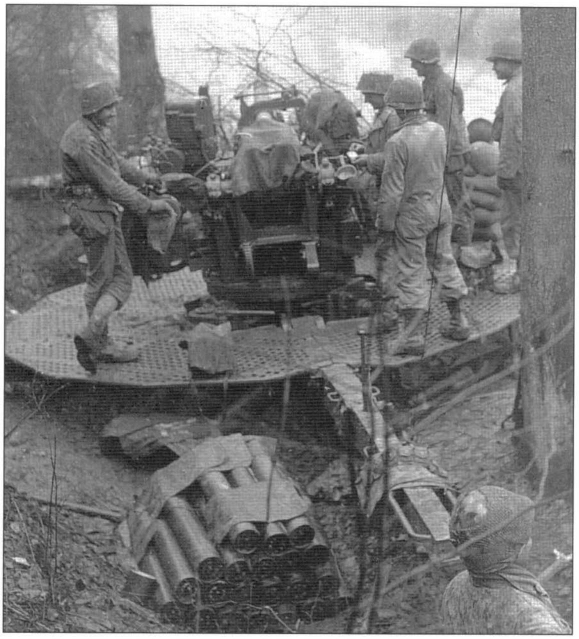
The towed tank destroyer battalions were doomed by the combat in the Ardennes. One study concluded that self-propelled tank destroyers were five to six times more effective than the towed guns, and that the towed 3in guns were successful in only two out of nine defensive actions. In contrast, the self-propelled M10 3in tank destroyers had a favorable exchange ratio of 1:1.9 when operating without infantry support, and an excellent ratio of 1:6 when integrated into an infantry defense. The M10 tank destroyer units were successful in 14 out of 16 defensive actions against German tanks. The First Army report noted that tank destroyer battalion losses totaled 119, of which 86 were towed guns: a clear disproportion that



The 3in anti-tank gun was extremely difficult for its crew to maneuver without the assistance of a prime mover, as is evident from this view of a crew of the 801st Tank Destroyer Battalion near Hofen, Germany on February 2, 1945. This battalion converted to M18 76mm GMC tank destroyers a few weeks later. (NARA)

revealed the glaring vulnerability of the towed guns. The report concluded, "It is clear that during the battle of the Ardennes, the self-propelled battalion again proved its superiority over the towed battalion for both offensive and defensive action." In January 1945, Bradley's 12th Army Group began plans to convert all 3in battalions to self-propelled battalions as soon as possible. While this was not completed by the time the war in Europe ended in May 1945, only four battalions still had the towed 3in guns, compared to 41 with self-propelled tank destroyers.

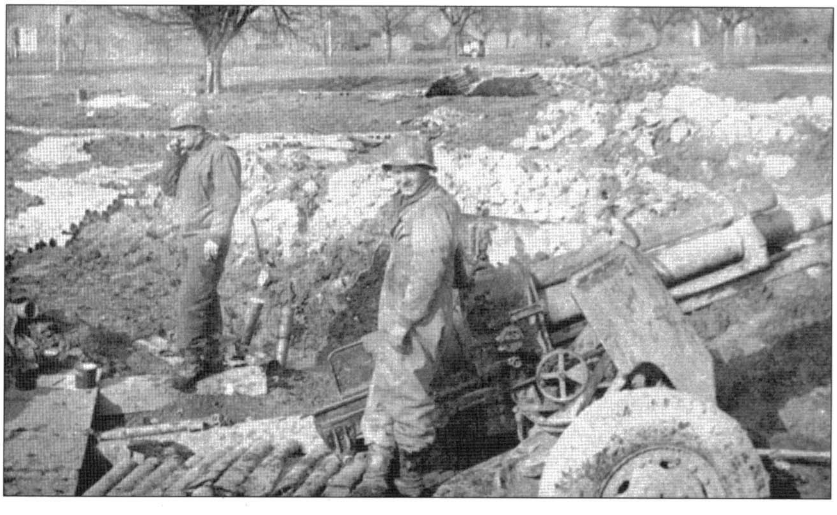
The 57mm gun remained the basis for infantry anti-tank units, though in the concluding months of the war, the lack of German armor meant that it was used mostly as an accompanying gun rather than in an anti-tank role. In some infantry units with manpower shortages the anti-tank gun companies were actually converted to normal rifle companies. In other units, the 57mm guns were left in depot, and the anti-tank companies were equipped only with bazookas. In February 1945 the AGF decided to replace the 57mm guns in regimental anti-tank companies with 17 T26E1 90mm heavy tanks. In reality, there were never enough heavy tanks available in Europe to actually implement this change, but the decision influenced postwar actions to retire the 57mm gun.



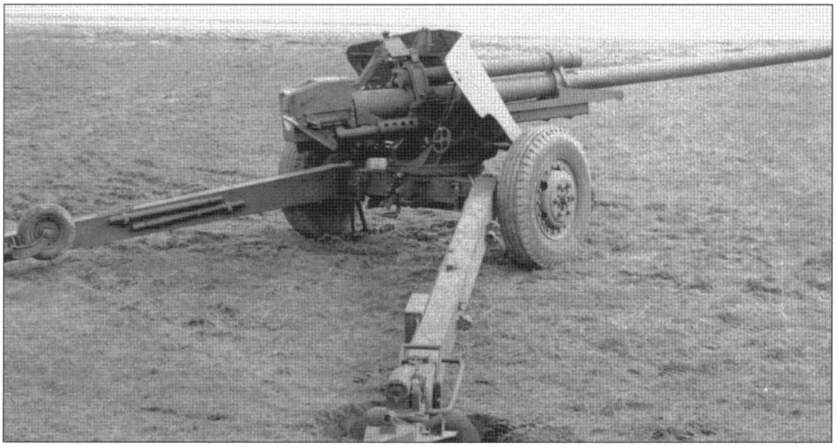
The desperate situation in the Ardennes in mid-December prompted the US Army to use expedient means to defeat the panzers. There were numerous 90mm anti-aircraft guns in the area as part of the defense of Antwerp against German V-1 missiles. Some of these were dispatched to key crossroads to form anti-tank barriers, such as this 90mm gun outside Malmedy. (NARA)

THE T8 90MM ANTI-TANK GUN

Reports of the German use of the 88mm anti-aircraft gun for anti-tank use had been widely reported by 1942, and in December 1942 Ordnance began preliminary studies of a 90mm anti-tank gun using the tube and ammunition of the 90mm anti-aircraft gun. The M1 90mm gun was mated with the M2 recoil mechanism from the 105mm howitzer as the 90mm gun



The towed tank destroyer battalions were frequently used for other roles in the 1945 fighting, sometimes as indirect artillery. Here, the 824th Tank Destroyer Battalion has their 3in guns emplaced for artillery fire missions during February 1945. The fiberboard packing tubes from the ammunition have been used to fashion a "corduroy" road and work area in the mud near the gun. (L. Kreiser collection, MHI)

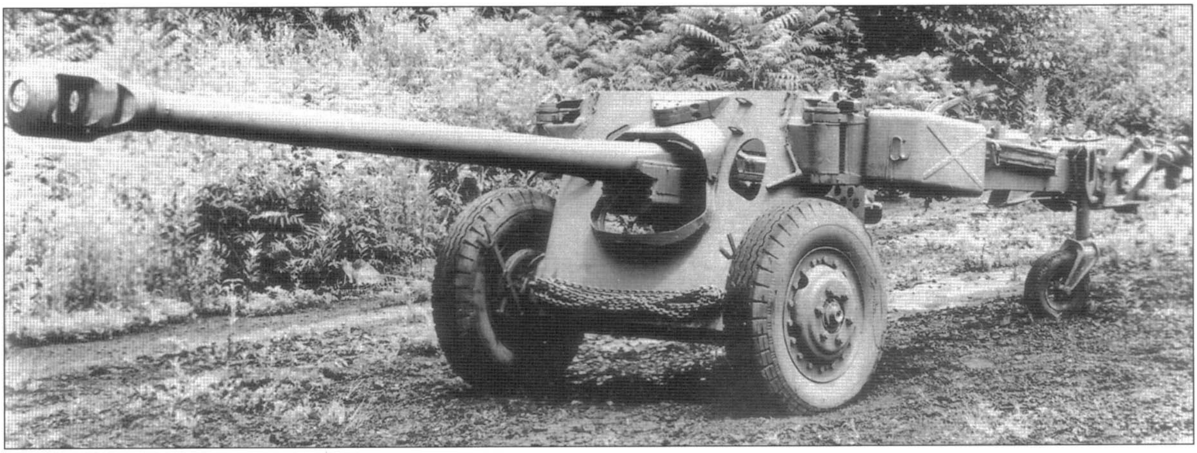


Only 200 of the 90mm anti-tank guns were manufactured, but there was little demand for them in 1945 due to the decision to shift entirely to self-propelled tank destroyers. This shows a 90mm T8 anti-tank gun on T5E2 carriage in firing position. (NARA)

T8, and mounted on a new carriage designated as the T5. This combination was extremely long, so the carriage design incorporated a feature to permit the gun to be towed with the barrel pointed over the trails; additionally, the trails were hinged to reduce the overall length when towing. A pilot of the T5 carriage was sent to APG in January 1944, but the complicated joints made necessary by the unconventional layout proved unsuccessful and the carriage was redesigned in a much more conventional fashion as the T5E1. The first T5E1 carriage arrived at APG in June 1944 but was found to be structurally unsound during cross-country trials. There was considerable pressure on the engineers, as reports from France indicated that the 3in gun was proving to be unsatisfactory in dealing with German Panther tanks, and the AGF wanted an initial batch of 600 T8 90mm guns as soon as was practical. The redesigned carriage was designated as T5E2 and three pilots were constructed. The resulting T8 90mm gun with T5E2 carriage was classified as limited standard on September 7 1944 in order to initiate the production process. A dedicated prime mover was developed for the 90mm gun, the Cadillac T39 light tractor. Six pilots were authorized and the first arrived for trials at Aberdeen Proving Ground in January 1945. However, in view of the small scale of 90mm gun production, no series production was authorized, and available vehicles were used instead.

When the design requirements for the 90mm anti-tank gun were formalized in November 1943, the T8 gun, particularly with regard to weight, could not meet some of the objectives. Rather than delay the development and production of the gun, a second 90mm design was outlined, consisting of the 90mm gun T13 and Gun Carriage T9. This was considerably more unconventional than the T5 carriage, using the gun shield as the main structural member with the trails connecting to the upper corners of the shield. The wheels mounted to the shield instead of a conventional carriage, and a retractable firing pedestal provided a stable platform. To further complicate the design, the trails could swivel around for travel with the barrel tucked under the trails. The design may have been unconventional, but it was also light: the entire assembly weighed only 6,850lb, compared to 9,950lb for the T8 90mm gun with T5E2 carriage.

Two further lightweight 90mm gun designs were initiated in July 1944 using more conventional carriages: the T20 90mm gun with T14



The most radical of the 90mm anti-tank gun designs was the 90mm T13 gun on the T9 carriage. As can be seen here, the shield was used as the central structure of the gun with the trails attached to the top corner. For towing, the trails were folded forward, enveloping the gun in order to reduce the length of the gun in transit. (NARA)

carriage, and the T20E1 90mm gun with T15 carriage. The plan was to test all four of the 90mm designs and choose the best for the final production batch of 400 guns. The first three T8 90mm anti-tank guns were completed in 1944, and the remainder of the 200 by June 1945. There was some interest in testing the new weapon in combat, so a single gun was dispatched with the Zebra mission to the ETO in February 1945. The Zebra mission was an effort to respond to criticism of the inadequacy of US tank and anti-tank guns as demonstrated in the recent Ardennes campaign. The failure of towed anti-tank guns and the desire by tank destroyer battalions to shift back to self-propelled guns led to a general lack of interest in the T8 90mm gun, and no records have been found to indicate that it saw any combat in Europe.

In early 1945 the whole issue of the need for a 90mm anti-tank gun was re-examined by the AGF, after the Tank Destroyer Board's contention that towed anti-tank guns had no place on the modern battlefield in light of the recent experiences in the Ardennes. Furthermore, there was no Japanese tank threat that justified such cumbersome weapons in the Pacific. As a result, the Ordnance Committee recommended terminating the other 90mm anti-tank gun projects. The exception was the intriguing T13 90mm gun, which remained in development to explore the practicality of its unconventional design. Another reason for the cancellation of the 90mm anti-tank gun projects was the feeling that such a large weapon could only be justified if it had exceptional anti-tank performance for dealing with heavy tanks such as the German Kingtiger or Jagdtiger. Two such weapons proposed were the T18 90mm anti-tank gun and T19 carriage, and the T21 90mm gun and T13 carriage. Little work took place before both were canceled in favor of a new 105mm anti-tank gun, which entered development in October 1944.

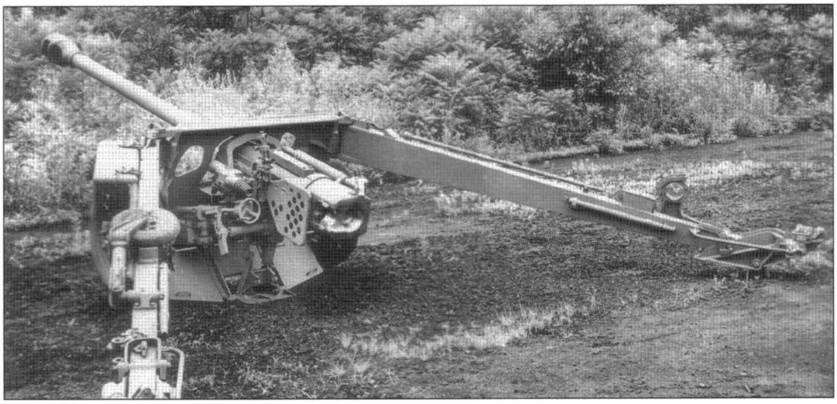
The T8 105mm gun and Gun Carriage T19 used a conventional split trail design, except that the mount was designed so that the gun could be rotated around for towing to reduce its overall length. The first version of the gun used conventional tires, but a program was begun to examine an unconventional wheel design using synthetic rubber tires fitted to lightweight magnesium wheels. Although four pilots were planned, two were canceled when the war ended in Europe. The two remaining guns went through trials after the war, but there was very little interest in such cumbersome weapons, and the programs went into limbo.

GUN TECHNICAL DATA

Caliber	37mm	57mm	3in	90mm
Gun designation	M3A1	M1	M5	M26
Carriage designation	M4A1	M1A3	M6	M18
Bore length	L/53	L/50	L/50	L/50
Weight (lb)	950	2,810	4,875	7,750
Length (ft)	12.8	16.7	23.3	26.5
Width (ft)	5.25	6.25	7.2	8.0
Height (ft)	3.1	4.75	5.3	5.75
Max. chamber pressure (psi)	50,000	44,000	43,000	38,000
Standard AP ammunition	M51 APC	M70 APC	M62 APC	M82 APC
Propellant weight (lb)	0.53	2.61	4.62	7.3
Projectile weight (lb)	1.92	6.28	15.4	24.1
Muzzle velocity (ft/s)	2,900	2,950	2,600	2,670
Penetration at 500yds (mm)	61	100	114	140
Improved AP ammunition	-	APDS	M93 HVAP	M304 HVAP
Penetration at 500yds (mm)	-	160	208	278

US ANTI-TANK GUNS IN FOREIGN SERVICE

About one-fifth of US anti-tank gun production was exported under the Lend-Lease program. The only significant recipient of the 37mm gun was the Koumingtang Army in China. Although the 57mm gun was originally produced exclusively for Britain, ultimately only about a third of its production was sent there, and this consisted entirely of the 57mm gun on M1A1 and M1A2 carriages. The Free French army received significant numbers of the 57mm gun, and most were dispatched to units of the First French Army that fought as part of the US 6th Army Group in southern France, Alsace, and southern Germany. No 3in anti-tank guns were provided under the Lend-Lease program, but some were transferred to French forces in 1945 from 6th Army Group stocks. Small numbers of anti-tank guns were supplied to Latin America including 57 57mm guns to Brazil, and 216 37mm guns: to Bolivia (four); Chile (198); Colombia (four); Cuba (one), and El Salvador (nine). After World War II, additional anti-tank guns were exported under the Military Defense Assistance Program (MDAP). However, by this time most of the guns were obsolete, and so the scale of the exports was modest.



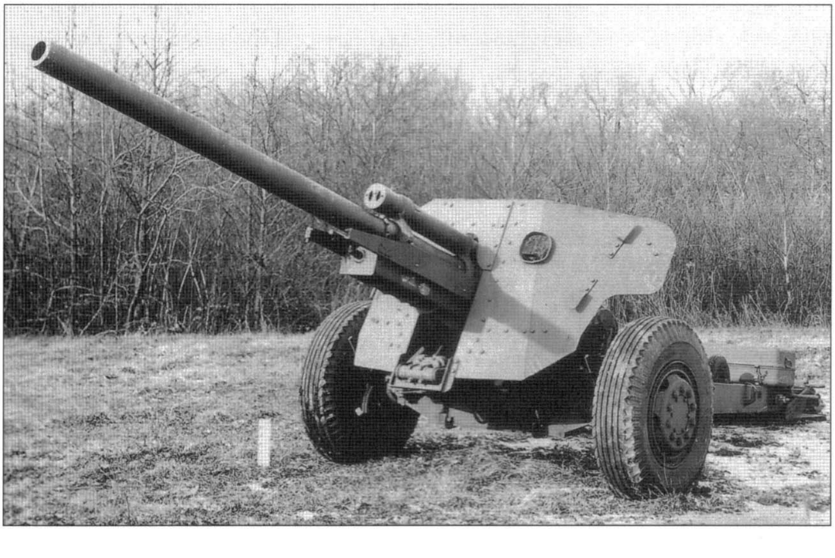
This is a rear view of the unusual 90mm T13 gun on T9 carriage. When in the firing position a pedestal was lowered from the shield to brace the gun, even though the carriage had conventional spades as well. No series production of this gun was undertaken due to a lack of interest in towed anti-tank guns in 1945. (NARA)

US ANTI-TANK GUN LEND-LEASE TRANSFERS 1941–45

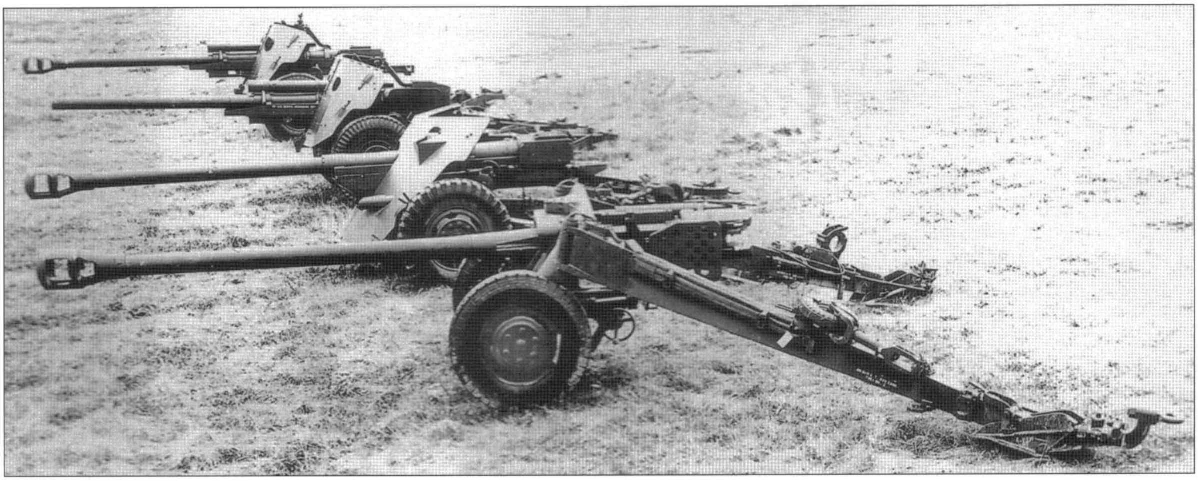
	37mm	57mm
Great Britain	78	4,242
Canada	3	
China	1,669	
France	130	653
USSR	63	400
Latin America	216	57
Other	100	
Total	**2,259**	**5,352**

US ANTI-TANK GUNS AFTER THE WAR

Recognition that the 57mm gun was obsolete led to significant changes in infantry organization after the war in Europe. The June 1 1945 TO&E for the regimental anti-tank gun company dropped towed guns entirely. In their place, the anti-tank company was authorized nine self-propelled guns, with the options being the M36 90mm GMC, the M4A3 (76mm) tank and the M18 76mm GMC, in that order of preference. The issue was re-examined after the war by the General Board – US Forces European Theater, which studied future requirements in light of wartime experiences. The General Board concluded that the 57mm was unsatisfactory but that recoilless rifles were not a suitable substitute, since they lacked the necessary armor-penetrating power. The board echoed the June 1945 AGF decision to substitute self-propelled guns for towed anti-tank guns, but instead of placing the M26 tanks in an anti-tank company, they recommended that the organic tank force in the division be expanded in size to a tank regiment. The General Board recommended replacing the 57mm guns in the airborne divisions with recoilless rifles because of the unique demands of these formations. Curiously enough, these changes were not implemented for several years. Instead, the airborne divisions were saddled with the T8 90mm gun in their anti-tank batteries, even though they lacked an aircraft or



The 90mm anti-tank gun arrived too late to see any extensive use in World War II. A single example was sent to Germany in February 1945 as part of the Zebra mission, but saw little if any combat. When standardized, it was designated as the 90mm M26 gun on M18 carriage. (NARA)



Four different 90mm guns were in development in 1945, although only one entered series production. From front to back these are the 90mm T13 gun on T9E1 carriage; 90mm T20E1 gun on T15 carriage, 90mm T8 gun on T5E2 carriage and 90mm T20 gun on T14 carriage. (NARA)

glider large enough to transport them on airborne missions. They were replaced in the early 1950s as more suitable alternatives became available. The War Department Equipment Board, better known as the Stilwell Board, concluded their study of towed anti-tank guns in May 1946 and recommended, "There should be no further development of towed anti-tank guns." In fact there was still some interest in towed guns for light units such as the airborne, but these proved to be a technological dead-end.

BIBLIOGRAPHY

This is the first book to be published on the history of US World War II anti-tank gun development, although there is coverage in several survey accounts of US artillery such as Ian Hogg's *British and American Artillery of World War II* (Arms & Armour, 1978). This account relies primarily on official sources such as the unpublished Ordnance history manuscript "Antitank Artillery" at the National Archives and Records Administration (NARA) in College Park, Maryland. The wartime technical manuals are useful for technical detail: see TM 9-1245 (37mm gun); TM 9-303 (57mm gun); and TM 9-322 (3in gun). Sources on the combat history of these guns were found in reports of the Observers Groups sent to the Mediterranean and European Theater of Operations, as well as postwar studies such as LtCol Emory Dunham's "Tank Destroyer History" for the AGF Historical Section in 1946, and the 1945 General Board report "Study of Organization, Equipment, and Tactical Employment of Tank Destroyer Units". Other operational records consulted include the various headquarters records of ETOUSA, US First Army, US Fifth Army, and the US 12th Army Group. These records were found primarily at NARA and the US Army Military History Institute (MHI) at the US Army War College, Carlisle Barracks, Pennsylvania. There are several very good accounts of the trials and tribulations of the Tank Destroyer force, including Charles Baily's *Faint Praise: American Tanks and Tank Destroyers during World War II* (Archon, 1983); Christopher Gabel's *Seek, Strike and Destroy: US Army Tank Destroyer Doctrine in World War II* (US Army CGSC, 1985); and Lonnie Gill's *Tank Destroyer Forces WWII* (Turner, 1992).

COLOR PLATE COMMENTARY

A: 37MM ANTI-TANK GUN M3 ON CARRIAGE M4

This plate shows the basic 37mm anti-tank gun with its trails in the deployed position. Like other US Army equipment, anti-tank guns were finished in overall lusterless olive drab. In general, the only part not painted was the breech block, which was left in its original metal finish. Anti-tank guns seldom carried markings, though on occasions some batteries would paint the gun number on the weapon.

B: JEEP AND 37MM ANTI-TANK GUN, INFANTRY SCHOOL, FT BENNING, GEORGIA, 1942

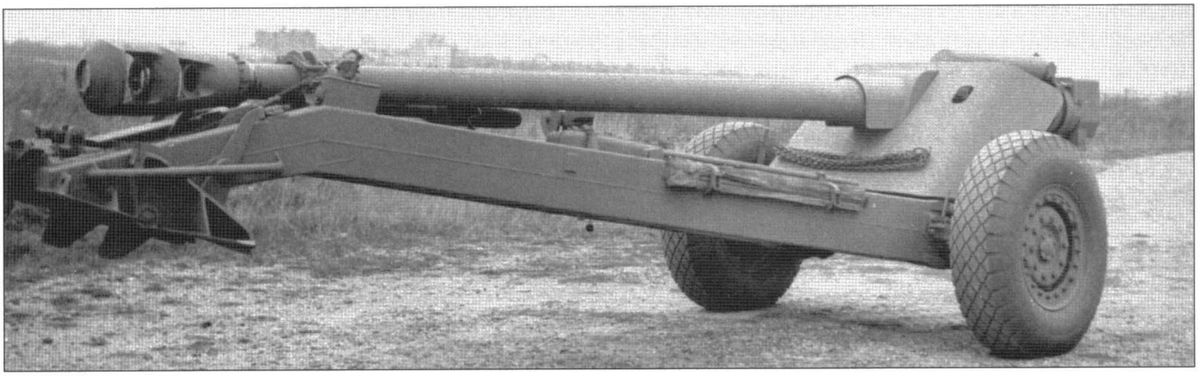
When first introduced into service in large numbers in 1941, the 37mm anti-tank gun was generally towed by a ¼-ton truck, better known as a jeep. The Tables of Organization and Equipment (TO&E) authorized the use of a ¾-ton truck, but these were often in short supply. The markings on US infantry vehicles in the early stage of the war tended to be very elementary. In this case, the jeep has its registration number painted in blue drab on the rear to the left of the spare tire. The use of the white star as national insignia did not become common until 1942, and many vehicles had very drab markings, like this one.

C: 57MM GUN M1 ON CARRIAGE M1A3

This plate shows the 57mm Gun M1 on Carriage M1A3 in its travel mode, with the trails locked. This was the most common version of the 57mm gun in service with US Army units in the summer of 1944. As with the 37mm gun, the finish is lusterless olive drab and there are no markings on the weapon.

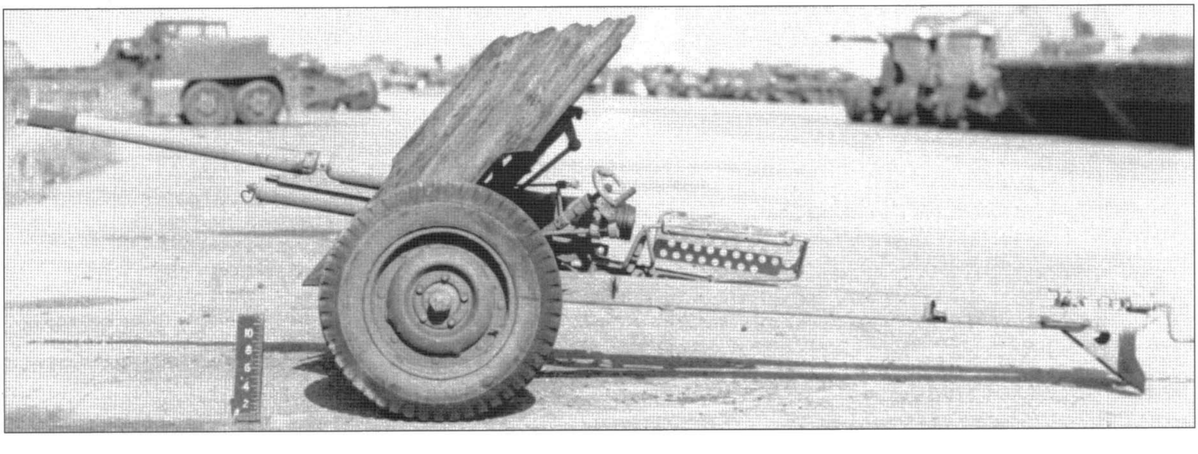
D: 37MM ANTI-TANK GUN M3A1 ON CARRIAGE M4A1

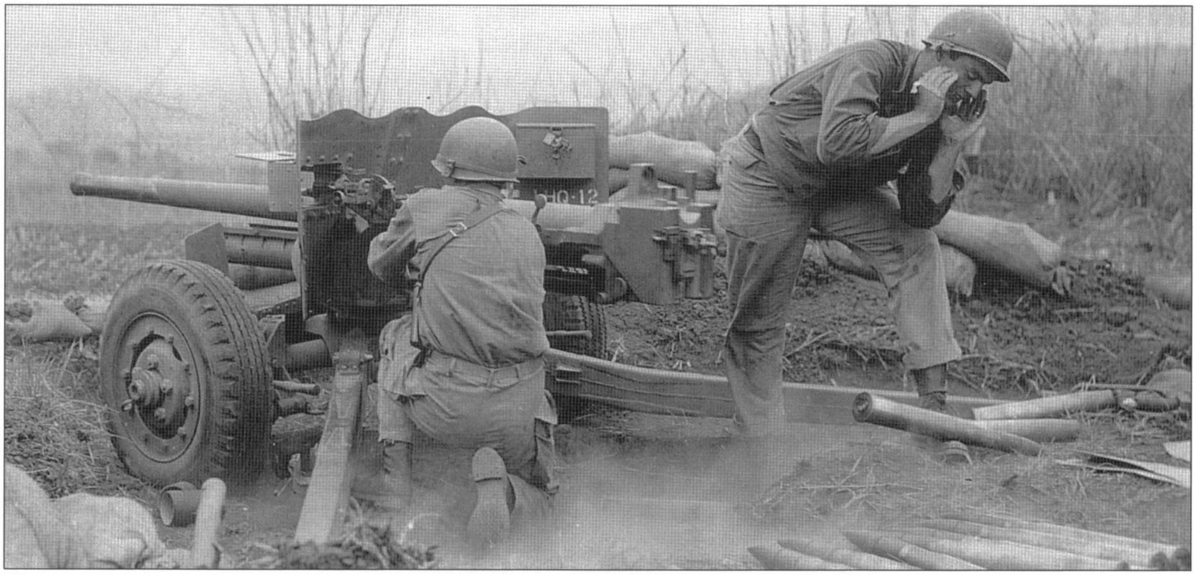
See plate for full details.



ABOVE **The most powerful anti-tank gun developed in the United States during the war was the 105mm T8 gun on T19 carriage. Like many of the large-caliber anti-tank guns developed in 1945, the carriage was designed to permit the gun to be traversed over the trails during travel to reduce the length of the gun, as seen here. This is the original pilot; the gun was later fitted with lightweight magnesium wheels. (NARA)**

BELOW **The Marine Corps in the Pacific sometimes enlarged the shields on their 37mm guns to provide more protection for the crew. They requested a standardized kit, which was tested by the army in 1945. It is seen here mounted on an M3A1 carriage. The top edges were scalloped to break up their silhouette for camouflage purposes. The war ended before the project came to fruition. (USAOM)**





The 57mm gun was not as widely used in the Pacific as the 37mm gun, but it did see service in some of the final campaigns. Here, a 57mm gun of the 152d Infantry, 38th Division is seen in action on Luzon on May 11, 1945. The relative lack of Japanese armor meant that these guns were used mainly for direct fire support. (NARA)

E: 3IN ANTI-TANK GUN M5 ON CARRIAGE M6

This plate shows the standard version of the 3in anti-tank gun in travel mode, with its trails locked. Like the other anti-tank guns shown here, it is in the usual drab finish of overall olive drab with no markings. Unlike vehicles, the crews used a serial number stamped on the gun for record-keeping, rather than a painted registration number.

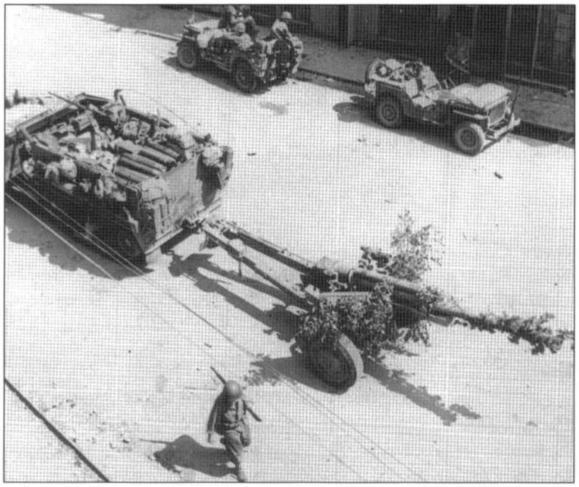
F: ANTI-TANK GUN PRIME MOVERS

This plate shows the authorized vehicles used for towing the three standard US Army anti-tank guns: the ³/₄-ton truck for the 37mm gun; the 1¹/₄-ton truck for the 57mm gun; and the M3 half-track for the 3in gun. In all three cases the markings are the standard late war style with a relatively small white star on the trucks, and white registration numbers on all three vehicles. The bumper codes for an infantry regiment anti-tank company were fairly simple. For example, in the case of the third gun of the anti-tank company of the 23d Infantry Regiment (2d Division), the codes would be 2I-23I on the left, and AT-3 on the right.

G: M2 HALF-TRACK AND 57MM GUN, 18TH INFANTRY, 1ST INFANTRY DIVISION, SOUTHERN ENGLAND, JUNE 1944

This plate shows a 57mm anti-tank gun belonging to an anti-tank platoon of the 18th Infantry, prior to embarkation for the D-Day invasion of Normandy. The 1st Division frequently used the M2 half-track as the prime mover for its 57mm guns, as seen here. The guns were issued with a pair of deployable shields that could be positioned on either side of the gun; one can be seen in the mine rack on the rear side of the vehicle. The markings on this vehicle are more elaborate than usual. The 18th Infantry used tactical insignia for its component battalions, and the circle insignia seen here indicates the 2d Company, 3d Battalion. The bumper codes are painted in an alternate fashion in black with the entire bumper painted in white. The white star is painted on the radiator flaps, and the circled Allied star is on the top of the hood. On the right fender is the yellow bridging circle that indicates the weight of the vehicle, with and without the gun. Above the white star on the lip of the radiator opening is stenciled "PRESTONE 43", indicating that the vehicle radiator was filled with Prestone anti-freeze in the winter of 1943. The crew has painted a name, "Joan", on the vehicle above the vehicle registration number, "USA W-4079484-S", and painted the nuts on the wheel hubs in white paint, a decorative feature and not standard practice.

Half-tracks such as the M3 half-track towed the 3in anti-tank gun, as seen here in Brittany in August 1944. Although the M2 half-track was designed as a prime mover, many units used the M3 half-track personnel carrier. (NARA)



INDEX

Figures in **bold** refer to illustrations

ammunition 6–7, 16, 24, 36, **D**
  packing tubes **40**
anti-aircraft guns 34, 39, 40, **40**
anti-freeze 47
anti-tank guns
  after the war 44–5
  battalion organization 9–10, 18
  British 10, 12–13, 15, 19, 20
  in foreign service 43–4
  German 4, 6, 10, 19, 20
  gun technical data 43
  production 1940–45 21
  towed vs. self-propelled 23, 33–4, 35, 38–40
anti-tank guns: 3in **3**, 17–20, **34**, **36–40**
  in combat 22–3, 33–4, 35, 36–7, 39
  effectiveness 36–7, 38–40
  M5 17, **19**, **21**, 47, **E**
  M10 33, 34, 39–40
  T10 17, **18**
anti-tank guns: 20mm automatic T3 7–8, **7**
anti-tank guns: 37mm 4–7, **9–12**, 46, **46**, **B**
  in combat 9–12, 21, 22, 23, 24–33
  effectiveness 22, 38
  M3 4–5, **5**, 46, **A**
  M3A1 5–6, **21**, 46, **D**
  scale plan **13**
  T3 4, **4**
  tapered-bore 6–7
anti-tank guns: 57mm 12–16, **18**, **22**, **24**, **33–4**, **39**, 47, **47**, **G**
  6-pdr Mk. III **23**, 24
  in combat 22, 23–33, 36, 37, 39, 40
  effectiveness 22, 37–9, 44
  M1 13, **15**, 46, **C**
  T2 14, **15**
anti-tank guns: 75mm 8–9, **8**
anti-tank guns: 76mm 20, **22**, 44
anti-tank guns: 90mm 40–2
  M26 **44**
  M36 GMC 38, 44
  T8 41, **41**, 42, 44–5, **45**
  T13 41, 42, **42**, **43**, **45**
  T18 42
  T20 41–2, **45**
  T20E1 42, **45**
  T21 42
anti-tank guns: 105mm 42, **46**
Antwerp, defense of 39, 40
assault guns, German 23, **24**

bazookas **3**, **6**, 8, 37
  in combat 33, 35, 40
Bruce, Gen A. D. 17, 18
Bulge, Battle of the (1945) **17**, 36–40, **37–40**
Butgenbach **38**

Cherence le Roussel 35, **35**

Darby, Col 21
Denholm, LtCol Charles 21
Devers, Gen Jacob 20

Dom Butgenbach 37, 38

Eddy, MajGen Manton 33
elevation gears 16

France, operations in 16, **22–4**, 23–35, **33–6**

gas deflectors 5–6
La Gleize 39
gun carriages
  German 19
  M1 13, 17
  M1A1 14
  M1A2 14–15
  M1A3 14–15, 46, **C**
  M2 16, **17**
  M2A1 16
  M2A3 8, **8**
  M3A1 **8**, **46**
  M4 4–5, **5**, 46, **A**
  M4A1 5, 6, 46, **D**
  M6 18, 47, **E**
  M18 **44**
  T1 4, **4**, 14, **15**, 17, **18**
  T1E1 4
  T2 **22**
  T3 20
  T5 4, 41
  T5E1 41
  T5E2 41, **41**, **45**
  T9 41, **42–3**
  T9E1 **45**
  T13 42
  T14 41–2, **45**
  T15 42, **45**
  T19 42, **46**
gun prime movers 9–10, 41, 47, **F**
  jeeps 10, 46, **B**
  M2 half-tracks **24**, 47, **G**
  M3 half-tracks **16**, 18, 47, **47**, **F**
  M39 AUVs 18–19, **20**

Hofen **39**
Humain **38**

Isigny 33
Italy, operations in **14**, 16, 21–3

Kasserine Pass, battle of (1943) 10
Krinkelt-Rocherath 36, 37

Lewis, BrigGen Thomas 11
Losheim Gap 36
lunettes 14, **24**, **D**

machine guns 3–4, **3**
McKinley, LtCol 37
McNair, Gen Lesley 17–18
markings 46, 47, **G**
Mortain 35
muzzle brakes **21**

North Africa, operations in 10–11, **12**, 14, 17–18

Operation *Cobra* (1944) **22**
Operation *Freuhlingswind* (1943) **12**
Operation *Luttich* (1944) **34**, 35, **35**

Pacific operations 10, **10–11**, **46–7**
paint and finish 46
Patton, George S. 22
Philippines, operations in **9**, 10
propellants 19

rifles, recoilless 44

Ste. Mère Église 24
Schauffenburg **3**
shields 6, 18, **18**, **24**, **46**
Siegfried Line 36
Solothurn 5, 7–8
Spanish Civil War 4

tanks
  German 10, 11, 19–20, 21, 33
  Italian 21
  Japanese 10
  US 20, 40, 44
tapered-bore adapters 6–7, 16
tires 6, 14, 42

US Army
  1st Division: 16th Infantry 21
  1st Division: 18th Infantry 47, **G**
  1st Division: 26th Infantry 37, **38**
  2d Armored Division: 41st Armored Infantry **22**
  2d Infantry Division 37–9
  4th Cavalry Group 38
  4th Division: 12th Infantry **34**
  7th Armored Division 37
  7th Division **10**
  9th Division: 39th Infantry 10, 33, 35, **35**
  30th Division 35, 36
  30th Division: 117th Infantry 3
  34th Division: 168th Infantry **12**
  38th Division: 152d Infantry **47**
  75th Division 37
  77th Division: 306th Infantry **11**
  82d Airborne Division **23**, 24
  84th Division: 334th Infantry **17**
  101st Airborne Division 24
  614th Tank Destroyer Battalion **36**
  772d Tank Destroyer Battalion **37**
  801st Tank Destroyer Battalion 18, 36, **39**
  805th Tank Destroyer Battalion 22–3
  820th Tank Destroyer Battalion 36
  823d Tank Destroyer Battalion **3**, 18, 35
  824th Tank Destroyer Battalion **40**
  899th Tank Destroyer Battalion 33

Walker, MajGen Walton 11
wheels 14, 15–16, 42

Zebra mission (1945) 42

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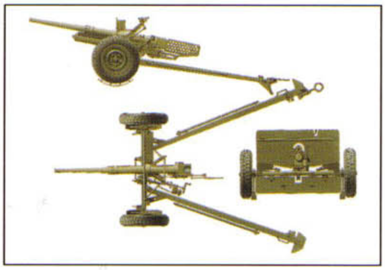

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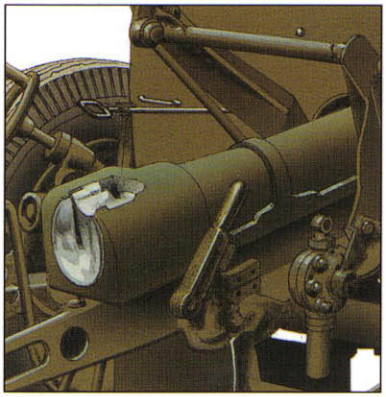

Cutaway artwork

Photographs

US Anti-tank Artillery 1941–45

The US Army's development of the 37mm anti-tank gun began in response to needs identified during the Spanish Civil War. By the time it entered service in Tunisia in 1943, the gun was already obsolete, and the US began the licensed manufacture of the British 6-pounder in the hope of finding a quick solution to its artillery requirements. This in turn proved unequal to the demands of warfare in France in 1944, and further anti-tank measures were developed – rocket propelled grenades for infantry use, and weapons designed specifically for use by the Tank Destroyer Force.

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